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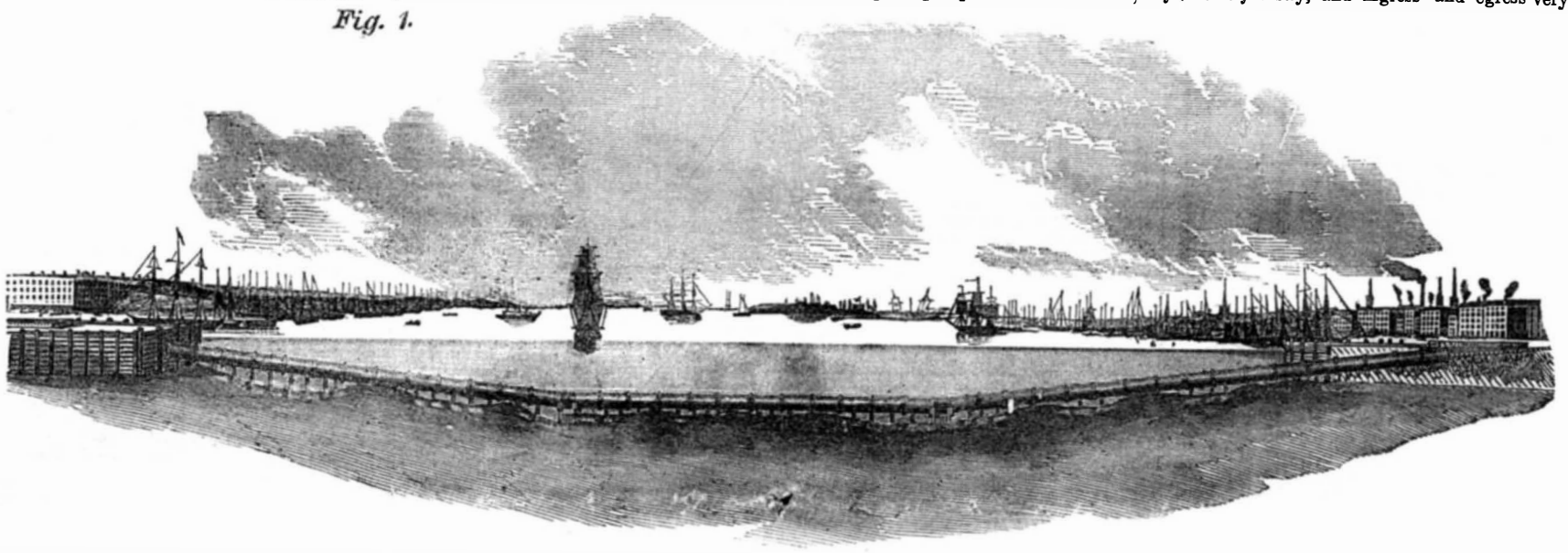
HOLCOMB'S SUBMARINE CARRIAGE WAY.

The accompanying figures illustrate a design by H. P. Holcomb, C. E., of Winchester, Ga., for a Submerged Viaduct or Tunnel, adapted to the passage of rivers or other narrow waters, where the purposes of navigation or other difficulties render the common elevated bridge inconvenient or impracticable. This plan proposes a tube of either wrought or cast iron sunk in the water, and conforming somewhat to the general profile of the bed of the stream, being sufficiently low to allow shipping to pass over in the usual channel. As the tube approaches the shores it will ascend on an easy inclination, and pass out of the stream with its upper side at low water mark, into abutments of masonry.

Mr. H. proposes a cylindrical tube of twenty feet diameter. About one-third of this would be occupied with ballasting of stone, which would, at the same time, form a double roadway for traffic in each direction, while in the curves of the cylinder on each side would be placed the foot ways, suspended by rods, attached to the cylinders above. Fig. 2 is a cross section of the cylinder or tube, showing this arrangement; while fig. 3 is a view of one of the entrances.

He proposes to place the abutments, say one hundred feet inland, at which point the depth of the open approach would not exceed fifteen feet, having reference to a tidal range of six feet. Mr. Holcomb, who is an experienced civil engineer, holds that the cost of this plan, as compared with tunneling under the bed of a stream, as in the case of the Thames tunnel, would be trifling, and greatly less than an elevated bridge adapted to such situations. The cause of the failure of the Thames tunnel as a work of utility, is the great depth at which the termini were necessarily laid, rendering the approaches extremely costly, and ingress and egress very

Fig. 1.



difficult—so much so, that the entrances for vehicles have never been constructed The plan in question removes these difficulties entirely.

The designer writes us as follows:—

"I propose, at intervals of say 600 feet, to drive a foundation of piles, and to saw them off to an exact level at the proper point, near the bed of the stream. This is a matter of easy accomplishment. I am now constructing a work on foundations of this sort, and, by very simple machinery of my contrivance, saw off the piles at any depth with great precision and dispatch—in this case the foundations consist of 300 piles in each. The pile foundations are seen in fig. 1.

To provide for any expansion or contraction of the tube, or any slight settlement or change of form, I propose to corrugate those parts of the tube over the piles, making those parts of iron no thicker than sufficient to bear the pressure of the water, as being supported on each side by the seat, no other duty would be exacted at these points. With the object of greater expedition in the construction of the tube, I would construct it in sections of say fifty feet, the several sections to form the complete tube, to be bolted together through flanges provided for the purpose. This arrangement may be seen at one point in fig. 1. The seats over the piles would be armed with spikes or points, to secure the tube against lateral movement, by taking hold of the heads of the piles. Of course the ballasting would be in such quantity as to overcome the buoyancy of the tube in the water without loading it beyond what might be necessary for a firm and secure bearing in the seats."

Mr. Holcomb's design provides for braces across the tube at the level of the roadway, which would, of course, be concealed by the pavement. Our artist has represented uprights between the carriage-ways, and has filled the spaces under the foot-ways at each side with stone, both of which modifications may be adopted, if sufficient space can be afforded, but Mr. Holcomb economises room at both these points by leaving the central portion clear, though with a dividing ridge on the road-way, and allowing the hubs of the wheels to project under the foot-ways on each side. To do perfect justice to Mr. Holcomb's design, which, we may remark, is eminently practical in every feature, the tube should have been represented as supported only at the points where the corrugations are located, the piles at those points serving as piers, so

Fig. 2

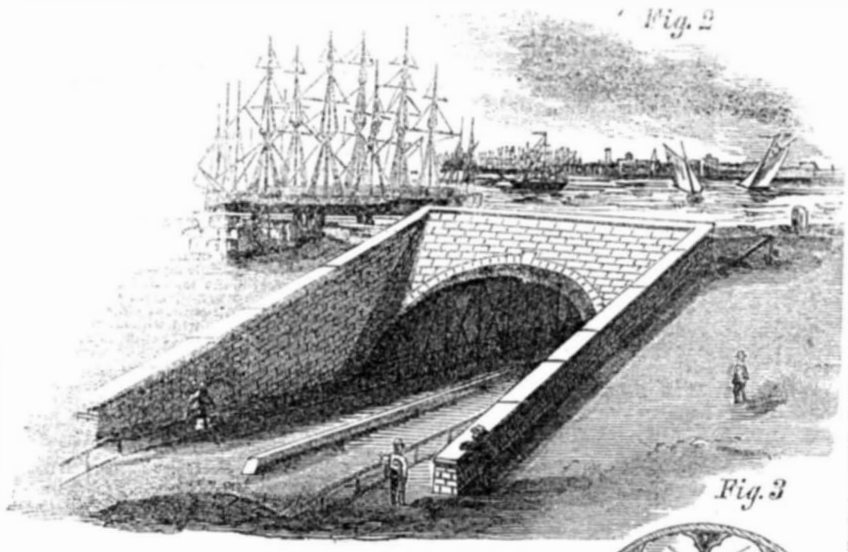
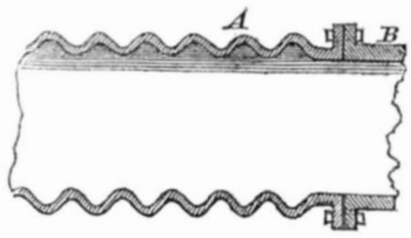


Fig. 3

Fig. 4



that it would be, in fact, a perfect tubular bridge, with the advantage that the weight of the tube would be almost supported by the water, while the corrugations which are represented larger in fig. 4, allow for any contraction and expansion, and also for any distortion of the tube in locating the structure, and for any unequal settling or slight movement which might occur afterwards. The buoyancy of the tube is the same, whatever the depth of the water above it, except for the very slight compression of the fluid at increased depths, which in this case is too slight to be noticed, and consequently the tendency of the tube to rise may be very readily and positively calculated without reference to tidal action. The weight of the tube itself with its braces and appendages, external and internal, being easily ascertained by calculation or by trial, it is designed to add only sufficient masonry in the interior to secure a sure preponderance of downward force.

The supports or massive seats, located firmly on the piles at the point where the corrugations are represented, will thus be compelled to bear only this slight preponderance, with the addition of the wagons or other matter moving within.

The bottom may or may not be dredged to a tolerably even outline. Our engraving (fig. 1,) shows it very irregular indeed; but it might be preferable to remove the elevations and lay the tube as low as possible, in order to retard the motion of the tide as little as possible, and to allow the whole to be subsequently covered and protected with stone, etc. if desired.

To the good citizens of Chicago we would specially recommend this plan of crossing the Illinois river as being well adapted to their wants.

Inquiries for further information, estimates or the like, in reference to this design, may be addressed to H. P. Holcomb, Winchester, Ga.

Antediluvian Remains.

Professor Emmons, in his recent report to the Legislature of North Carolina, mentions the discovery, in the sedimentary rocks of Montgomery county, in that State, of fossils, of an age anterior to any previous discoveries of traces of animal life.

California Coal.

The Sacramento *Union* at last announces that a bed of coal has been discovered within thirty miles of that city, and a load has been brought to it, and used with great satisfaction. The coal is bituminous; the vein is twelve feet thick, and the bed more than a mile wide and several miles long.

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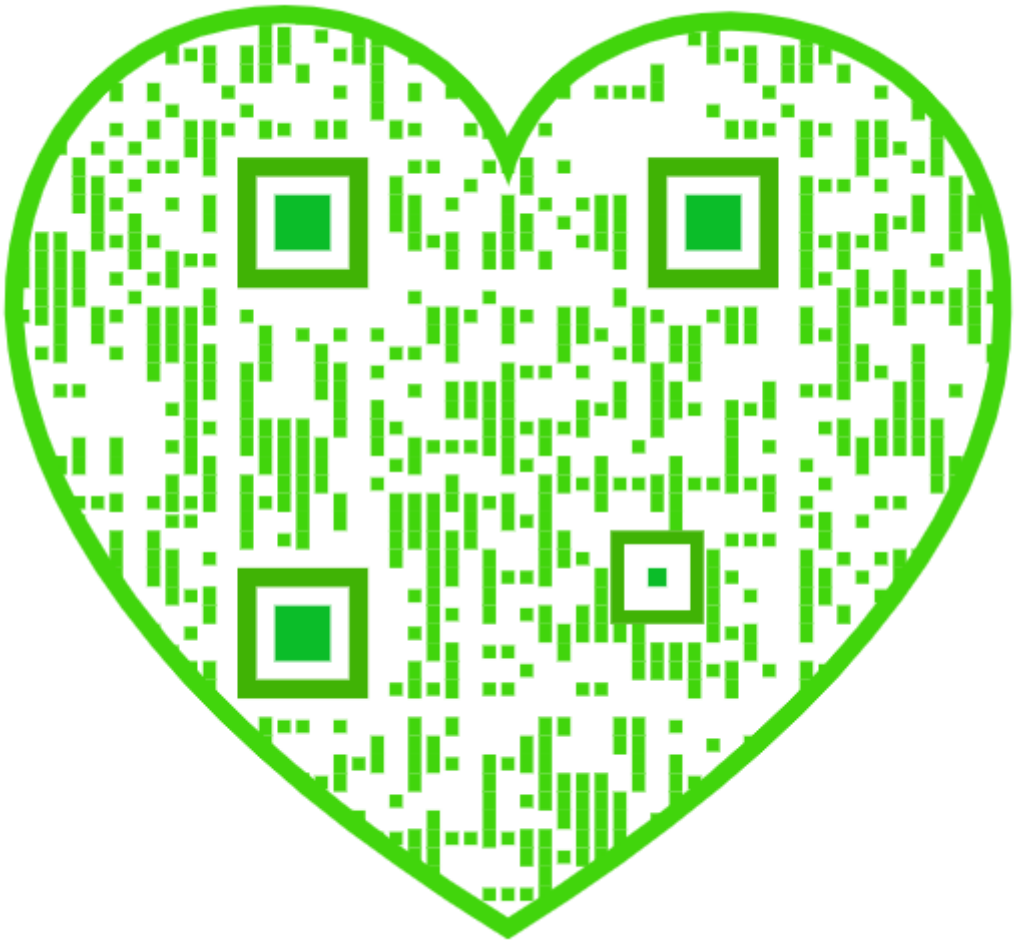

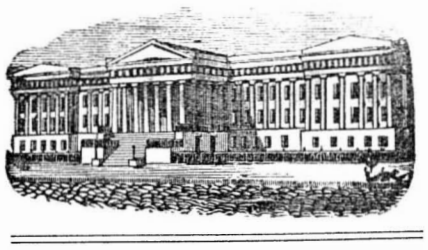

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The rapid growth of our Patent Agency Business, during the past three years, has required a great addition to our ordinary facilities for its performance, and we are now able to announce the completion of a system which cannot fail to arrest the attention of all who have business of this kind to transact.

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will be, as usual, at No. 128 Fulton street, New York. There is no other city in the Union so easy of access from every quarter as this, consequently there are greater advantages in regard to the transmission of models, funds, &c, through the various channels that center in New York. Two of the partners of our firm reside here, and during the hours of business are always at hand to counsel and advise with inventors. They are assisted by a corps of skillful Examiners, who have had many years of active experience in the preparation of cases for the Patent Office.

To render our Patent Agency Department complete in every respect, we have established a

BRANCH OFFICE IN THE CITY OF WASHINGTON,

on the corner of F and Seventh streets, opposite the United States Patent Office. This office is under the general care of one of the firm, assisted by experienced Examiners. The Branch Office is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington having business at the Patent Office are cordially invited to call at our office.

A SPECIAL REQUEST.

Our facilities for the speedy preparation of cases previous to the application for the patent being much more extensive in New York than at Washington, we especially require that all letters, models and remittances should be made to our address here.

EXAMINATION OF INVENTIONS.

We have been accustomed from the commencement of our business—twelve years since—to examine sketches and descriptions, and give advice in regard to the novelty of new inventions, *without charge.* We also furnish a printed circular of information to all who may wish it, giving instructions as to the proper method which should be adopted in making applications. This practice we shall still continue, and it is our purpose at all times to give such advice freely and candidly to all who apply to us. *In no case will we advise an inventor to make application unless we have confidence in his success before the Patent Office.*

Our extensive experience in mechanical and chemical improvements enables us to decide adversely to nearly one half of the cases presented to us for our opinion, before any expense has occurred in the preparation of the case for a patent.

When doubt exists in regard to the novelty of an invention, we advise in such cases a

PRELIMINARY EXAMINATION

to be made at the Patent Office. We are prepared to conduct such examinations at the Patent Office through our "Branch Agency," upon being furnished with a sketch and discription of the improvement. Our fee for this service will be $5.

After sufficient experience under this system, we confidently recommend it as a safe precautionary step in all cases before application is made for a patent—not that there will be no rejections under the system It is impossible to avoid such results in many cases, owing to the exceedingly wide range taken by the Examiners in the examination of cases; but, nevertheless, many applicants will be saved the expense of an application by adopting this course. Applicants who expect answers by mail must enclose stamps to pay return postage.

THE COSTS ATTENDING AN APPLICATION

for a Patent through our Agency are very moderate, and great care is exercised in their preparation. No cases are lost for want of care on our part in drawing up the papers, and if the claims are rejected, we enter upon a speedy examination of the reasons assigned by the Commissioner of Patents for the refusal, and make a report to our clients as to the prospects of success by further prosecution.

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We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery Lane, London; 29 Boulevard Saint Martin, Paris, and 3 Rue Therrsienne, Brussels. We think we may safely say that three-fourths of all the European Patents secured to American citizens are procured through our agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to inventors. Any one can take a Patent there.

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[Reported officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING MAY 26, 1857.

SPINAL CORSETS—Alanson Abbe, of Boston, Mass.: I claim my improved manufacture of corset for the cure of spinal deflections, the same being made with counteracting springs, constructed and arranged laterally and longitudinally in the back portion thereof, substantially as specified.

MOWING AND REAPING MACHINES—Armory Amsden, of Rochester, N. Y.: I do not claim giving the bars of a reel, or of a cutting wheel, an inclined or spiral direction, such being a well-known device.

But I claim the combination of a continuous helix, F, with the cutters, C C, when said helix forces the grass or grain against the cutters in a direction transverse to the direction in which the helix revolves, for the purpose set forth.

VEHICLES—Charles Atkinson, of Danville, Ill., and Gilbert S. Manning, of Springfield, Ill.: We claim the construction of the vehicle shown, viz, the two pairs of springs, F F D D, attached to the ends of the front and back axles, A B, the springs, D, of the back axle being attached directly to the bed, E, and the springs, F, of the front axle, A, attached to the bed, E, by the ball and socket joint, the inner ends of said spring, F, being attached to a plate, G, provided with a friction roller, C, which rests or bears upon a segment guide, H.

We do not claim separately, or in itself considered, either of the parts above-named, but only the several parts when considered as a whole, and arranged as described.

[Two sets of plate springs are connected with the axles of the carriage near the ends of the axles. Those belonging to the front wheels are attached to a bed by means of a ball and socket joint, by which method the body of the vehicle is not subjected to all the jars and concussions that attend vehicles of the common construction. When either of the front wheels passes over an obstruction the movement is not transmitted to the bed of the carriage, because the ball and socket joint permits the axle and springs to move independently of the bed.]

REVOLVING FIREARMS—Fordyce Beale, of New Haven, Conn.: I claim making the spring catch by which the cylinder is locked in position for the discharge to conform to the periphery of the cylinder, and project in front of the recoil shield on one side of the cylinder, for the purpose of serving as a resting-place or seat to hold the cylinder in place for the insertion of the central arbor, substantially as described.

[This improvement relates to revolvers having a chambered cylinder or charge chamber rotating on an axis pin. The catch spring which locks the charge cylinder during a discharge is so made as to serve also for a guide and rest to center the cylinder when loaded, with great facility, to receive its axis pin or arbor—a simple and very excellent improvement.]

CARRIAGE HUBS—Sylvester W. Beach, of Chicago, Ill.: I do not claim broadly the application of a conical wedge and elastic ring as new.

But I claim the combination of a conical wedge and elastic ring with the dovetail form of the spoke apertures in the hub as described, and substantially as set forth.

GRIDDLES—Wm. Bennett, of New York City: I am aware that culinary vessels of different kinds have been used with various devices for carrying off the steam and smoke, and preventing their escape into the room, and that ventilating and other covers have been used for the same purposes, and for the other purposes upon gridirons stew and sauce pans, and other culinary vessels. I do not claim any of these covers or devices, as they are not new.

Nor do I claim any one of the features of my apparatus separately constructed.

But I claim the new article of manufacture described, comprising the griddle and its ventilating cover, the former being constructed with a flaring flange, a, openings b, sliding register, c, and openings, d, and the latter with an enlarged opening, e, and flue, g, all arranged and operating substantially as and for the purpose specified.

HAND SEED PLANTERS—Silas P. Briggs, of Saratoga Springs, N. Y.: I claim the set or fastener, I, in combination with the plunger, arranged and operated substantially in the manner and for the purpose set forth.

GRAIN SCOURERS AND SEPARATORS—Saml. Canby, of Ellicott's Mills, Md.: I do not claim of themselves scouring disks or rubbers, as such are elements well known in all smut machines.

But I claim the series of scouring disks, I, and self-adjusting conical rubbers, J, on the same shaft and alternating with the disks, in combination with the hoppers, F, performing the double function of rubbing and concentrating the grain, the perforated casing, G, surrounding all of the disks except the lower, and the tight outer casing, A, arranged and operating substantially as described, to effect a progressive cleaning and final separation of the grain.

CUTTING AND BENDING SHEET METAL—Elias F. Coates, of Mystic Bridge, Conn.: I claim the cutting and bending of sheets of tin or other metal for roofs by one operation, and through a combination of devices substantially such as described.

REEFING TOPSAILS—James E. Cole, of New York City: I claim the supplementary shaft in combination with the roller spar, for the purposes and in the manner substantially as set forth.

BOMB LANCE—Julius Grudchos and Selmar Eggers, of New Bedford, Mass.: We claim the arranging the tube, o, for the purpose described.

We also claim the arranging the trigger, K, the trigger spring, L, the sear spring, H, the main spring, I, the hammer, F, the tube, E, in the manner and for the purpose described

We also claim applying the grooved ball, M, for the purpose of giving the lance a rotary motion, to prevent it striking sidewise.

TONGUE AND CASTER PLATE FOR HARVESTING MACHINES—Ralph Emerson, Jr., of Rockford, Ill.: I do not claim merely giving a lateral adjustment to the tongue of harvesting machines, as this has been done in various ways.

But I claim the tongue and caster plate, constructed in the manner and for the purpose described.

CURTAIN ROLLERS—Chandler Fisher, of Milton, Mass.: I claim the employment of a spring in connection with the pivot of a curtain roll, operating in the manner substantially as set forth, for the purpose of producing friction between the roll and the window frame, and thereby holding the curtain in any position in which it may be placed.

WAGON COUPLINGS—W. D. Guseman, of Morgantown, Va.: I claim coupling the hind and fore wheels of a wagon by means of an adjustable reach, C, and a correspondingly adjustable piece, G, on the front hounds, to which the rear hounds are pivoted, the whole being combined and operating together substantially in the manner set forth.

COOKING STOVES—Joseph Hackett, of Louisville, Ky.: I do not claim an oven with flues leading to flues in the door.

Neither do I claim operating the dampers by the opening and closing of the door.

But I claim the employment, in combination with the dampers of the oven and doors, of a rising and falling catch bar which has a turning knob, which is so arranged that in turning it shall rise over an inclined plane or stationary stop on the door, substantially as and for the purpose set forth.

[The oven in this stove is entirely surrounded with heating flues. The doors are made hollow, and are provided with dampers, so that they form flues that can be shut off from, and connected with, the main draft flue, as required—the dampers of the doors close automatically, when the doors are opened. Hollow stove doors are not new, but as hitherto made they have been impracticable for want of the dampers as arranged in this stove.]

SEWING MACHINES—Solomon B. Ellithorp, of New York City: I claim the attachment of the primary moving power to give motion to the needle in direct communication with the needle stock, and in vertical line with the needle.

REGISTERING APPARATUS FOR PRINTING PRESSES—Gordon McKay, of Boston, Mass.: I claim the use of brushes, or equivalents, for the purpose set forth, when automatically operated and combined with register points.

SUGAR BOILING APPARATUS—Adolph Hammer, of Reading, Pa.: Disclaiming connecting a series of branch pipes with and on to a main pipe, upon which said branch pipes may be rotated, in the manner described by Alfred Stillman, in his patent of May 16th, 1846.

I claim the peculiar arrangement of pipes described, whereby the steam is caused so to travel as to force one continuous and unbroken stream through the pipes, and to form a proper compensation or equalization of temperature throughout the whole surface of the coil, substantially as set forth.

INKSTANDS—Bennett J. Heywood, of London, Eng. Patented in England Jan. 16, 1856: I claim the means set forth of forcing ink into the fountain of inkstands, by the combined action of the lower valve, and the aperture in the top plate or disk, which acts alternately as a closed and open valve, by the application and removal of the finger.

ORE CRUSHING MACHINES—Samuel F. Hodge, of Detroit, Mich.: I claim the alternate lifting and dropping of a stamper hammer, or any weight, by means of a combination of a vertical rod with two clamping rollers, the periphery of one of which is not a complete circle.

LOOMS—Wm. H. Howard, of Philadelphia, Pa.: I claim the holding of the threads of weft and warp in a web of cloth, extended by combs applied to the selvedges and warp threads thereof, as described, or by any other equivalent mechanism.

DISCHARGING A HORSE AND SHAFTS FROM A CARRIAGE—Gilbert Hubbard, of Sandersville, Mass.: I claim the shaft rests or legs in combination with the shafts and bolting apparatus, and operated thereby, substantially in manner and for the purpose of supporting the shafts after their detachment from the carriage, as described.

I also claim the combination and arrangement of mechanism for attaching the shafts to and detaching them from the axle connections as specified, such combination consisting of the bolts, u u, the sectors, p p, the turning lever frame, i, and the rotary foot cam, b, connected and made to operate together substantially as explained.

I also claim the combination of the lever, w, and hold-fast cam, y, with the turning pawl, i, and the slider, n, connected with the latter, substantially as specified.

WASHING MACHINES—Abraham Huffer, of Hagerstown, Md.: I claim the arrangement of slotted levers, E and F, upright, G, springs, C and D, connected and operated upon by the pulley taps, H H, pulley, I, cord, L, shaft, K, and crank, J, in the manner described, for the purpose of facilitating the parallel adjustment of concave, B, as set forth.

SHINGLE MACHINE—Wm. A. Jarratt, of Patonsville, Tenn.: I do not claim the mechanism for reversing and throwing out the shingles, as I am aware that mechanisms equivalent thereto have been before employed.

I claim, first, Elevating and depressing the knife, L, and retaining the same in the required position, by means of the bars, C, on the bottom of the carriage, operating upon the cams, b, or studs, a a, substantially as described.

Secondly, The automatic apron, c, operating substantially as described, whereby the shavings are all taken from the shingles and knife, and thrown from the machine, the apron returning successively to a horizontal position to receive the shavings, as and for the purpose set forth.

REELS FOR YARN OR THREAD—Christain Knauer, of Pittsburgh, Pa.: I claim the combination of the plates, A and B, provided with the ratchet, a', and pawl, b, the curved arms, c, and swivel guides, d', arranged and operating substantially as described, for the purpose specified.

CORN PLANTERS—Robert Kuschke and Peter Merkel of St. Louis, Mo.: We claim the reciprocating seed boxes, L, arranged and operated in the manner and for the purpose set forth.

SIZING COMPOSITIONS—John Leigh, of Manchester, Eng.: I claim as my invention or discovery the sizing and dressing of yarns, woven goods, and paper, by means of the alkaline silicates, as set forth.

[This composition for dressing warps is stated to be far superior to common sizing for this purpose. It imparts a smooth surface to the threads, makes them tougher, and not so liable to break, which are very important advantages.]

FIREARMS—Edward Lindner, of New York City: I claim the construction, arrangement and operation of the rack specified, i. e., the rack when composed of a series of cones superposed to each other, the bases of said cones bearing upon studs that propel the cartridges in one or more charge barrels ranged around said rack, in the manner and for the purpose specified.

I also claim revolving the breech piece, D, by the mechanism specified, when arranged to act upon the interior surface thereof.

I also claim the plate described placed in front of the breech chamber, for the purpose of retaining the cartridges in said chambers which do not face the barrel.

I also claim the knee piece, H, in combination with the hammer, L, and stop bolt, O, the said parts being so arranged in relation to each other that by the act of cocking the gun the stop-bolt shall be withdrawn from the recesses of the breech, thus leaving it free to revolve substantially as set forth.

HYDRO-DYNAMIC MACHINE FOR TESTING STRENGTH OF MATERIALS—Francis C. Lowthrop, of Trenton, N. J.: I do not desire to confine myself to the precise form of the framework, or to the material of which it is constructed, to the precise arrangement of gearing shown, or to any particular construction of indicator, as the system of gearing may be modified without altering the result, and as a weighted valve or other indicator may be used instead of a pressure gage,

But I claim the combining of gearing and other suitable mechanism for applying strains for forces to the object to be tested, with a piston or plunger operating against a body of water within a cylinder or barrel, in such a manner that on applying the said force or strain such a pressure shall be transmitted to the fluid, and to any suitable indicator communicating with the same, that the amount of strain or force on the object may be readily calculated.

WIND WHEEL—James Mitchell, of Woodsfield, O.: I am aware that weights have been applied to the fans of said wheels, and connected to sliding heads, and so arranged as to render them self-regulating. I do not claim, therefore, a weight thus applied.

Neither do I claim the levers, f, applied to the fans as shown, nor the stopping cord, m, for they or their equivalents have been previously used.

But I claim first, Placing the arms, L, of the fans obliquely, so as to have a proper degree of inclination with the shaft, E, for the purpose specified.

Second, I claim attaching the arms, L, to the levers, K, and connecting said levers to the sliding collar, N, operated as shown, for the purpose of adjusting the arms, L, more or less obliquely with the shaft E, as desired.

[This is an improvement in self-adjusting windmills. It embraces a compensating device, for overcoming the centrifugal action of the revolving arms, which in other windmills tends to prevent the sails from adjusting themselves when rotating rapidly. A simple device also regulates the inclination of the arms, so as to set them with facility at the proper angle. The improvements patented are designed to render windmills more easily managed, and to operate more safely and accurately under all circumstances.]

ORE WASHER—Pierre P. Martin, of Paris, France. Patented in France May 13, 1856: I do not claim any one of the component parts taken separately.

I claim the general arrangement of the apparatus as described and represented.

REPEATING FIREARM—Wm. W. Marston, of New York City: I claim the combination of the exploder, h, and cylinder, g, actuated by the dog, f, or its equivalent, to explode successively the barrels arranged vertically over each other, substantially as specified.

MAKING PAPER PULP—M. A. C. Mellier, of Paris, France, Aug. 7, 1854—patented in England Oct. 26, 1855: I do not claim the general use of caustic alkaline solutions, nor the employment generally of a close boiler for boiling straw and other vegetable fibrous substances.

But I claim the use of a solution of caustic soda, n a o, in a compartment of a rotary vessel separate from that which contains the steam heat, substantially as described.

I also claim the described process for bleaching straw, consisting in boiling it in a solution of pure caustic soda, n a o, from 2 to 3 Beaume, at a temperature not less than 310 Fahr., after it has been soaked and cleaned, and before submitting it to the action of a solution of chloride of lime from 1 to 1 1-2 degrees, substantially as described.

MANUFACTURE OF IRON AND STEEL—Robt. Mushet, of Coleford, Eng. Patented in England, Sept. 22, 1856: I claim the addition of a triple compound or material of or containing iron carbon and manganese to cast iron which has been purified and decarbonized by the action of air whilst in a molten or fluid state, or in any convenient manner, so as to become mixed and combined in the process of manufacture, in order by the union of these substances to obtain malleable iron and steel.

BRICK MACHINES—Stephen Parks, of San Francisco, Cal.: I do not claim the rotating shafts, q, provided with teeth or arms, g, for tempering the clay, for they have been previously used.

Neither do I claim feeding the molds to the press box, by means of a reciprocating or swing cross head, for I am aware that such a device has been used before.

But I claim feeding the molds to or underneath the molding or press-box C, and also discharging them therefrom by means of the reciprocating and swinging cross-head, f', operated by the rods, a,' a'', connected with the slides, b'' and the shafts, A' B', when used in combination with the pivoted inclined planes, d d, and projecting arms, g' g', substantially as described for the purpose specified.

[In this brick machine there is a scraper that removes all the surplus clay from the upper surfaces of the molds, so that all the clay in a mold is subjected to an equal pressure, forming a brick of perfect shape and uniform density. The molds are also discharged in a direct line on the same plane, which prevents them from being jarred as in some other presses, the least concussion having a tendency to detach the sand from the molds, and thus cause the compressed clay to adhere to them.]

COTTON CULTIVATORS—A. A. Roberts and Baldwin Davis, of LaGrange, Ga.: We claim, in combination with the frame, "A A, A, A" and brake "e" as described, the movable frame, "B, B, B, B", armed with hoes, "a," and a harrow, "c c," the teeth of said harrow being so arranged as to cultivate between the bunches of cotton, and at the same time clear the standing cotton plants from clods, &c., in the manner set forth,

FERTILIZING COMPOUNDS—L. S. Robbins, of Brooklyn, N. Y.: I do not claim the separate use of superphosphate of lime or of green sand,

But the new composition of matter obtained by the intimate mixture of green sand and superphosphate of lime in a finely pulverized form for the purpose specified.

MAKING STOVE PIPE—M. C. Root, of Toledo, O.: I claim the arrangement and combination together of the edging, grooving, forming, swaging, expanding and contracting rollers, C D, E J, (a b) (c d), as described.

I also claim giving a spiral form to the groove (m) of rolder D, as set forth.

[In forming stovepipe by machinery, five machines have been employed to perform all the operations; in these no less than eleven rollers were used altogether, three separate rollers to form the pipe, two to turn the edges, two to swedge or fasten the lock, two to produce the bead, and two to expand or contract the ends. This single machine, having only four rollers, performs in less time all the work that can be done by one person with five of the old machines, and at the same time the work which it executes is of a superior character.]

COMPRESSING GASEOUS BODIES—Wm. A. Royce, of Newburg, N. Y.: I claim the described apparatus for compressing or packing gaseous media, substantially as described and shown.

BIT FOR CUTTING OUT CYLINDRICAL PLUGS—C. W. Saladee, of Columbus, O.: I claim the projecting lips or cutters, A A, as shown in figs. 1, 2 and 3, for the purpose of cutting out round plugs of wood in the manner substantially as set forth.

APPARATUS FOR EXAMINING VESSELS' KEELS—Jas. E. Simpson, of East Boston, Mass.: I claim the described apparatus for examining keels of vessels, consisting essentially of the levers F and rods G, arranged and operating in the manner substantially as set forth.

CORN PLANTERS—F. J. Smith, of Four Corners, O.: I claim the combination of the rods, m m'. and cut-off plates, n, with the springs, i i, and the inclined recesses in the tongue, arranged and operating as described for the purposes specified.

CUTTING GROOVES AND SLOTS—R. F. Underhill, of Indianapolis, Ind.: I do not claim the tables, A or E; neither do I claim the set screws, H H, J J, nor the cylindrical ring G', nor the ball and socket joint on the top of the said cylindrical ring.

Neither do I claim the curved "standard" D, nor the head, I; neither do I claim the screw N, nor the hand-wheel, P, taken separately: neither do I claim as new the using of revolving circular cutters, for such have long been used.

But I claim, first, forming cutting edges on the outer ends of the cogs or cog-wheels, substantially as described for the purpose set forth.

Second, The combination of the cutter, V, as constructed, the cogged wheels, R S T U, the shaft W, and the slotted "arbor" K, with the adjustable wedge, g, and table E, or any equivalent device, arranged substantially as described for the purpose set forth.

TANNING APPARATUS—O. B. Wattles, of Waddington, N. Y.: I claim the hides laced in the frame entirely around its border, and sustained vertically in the vat in the manner set forth.

SEWING MACHINES—T. S. Wells, of Utica, N. Y: I do not claim the invention of a two-pointed needle with an eye in the center, nor a two-pointed needle with a slit or fissure to receive and pinch the thread.

Nor do I claim the employment of a revolving finger for the purpose of drawing the thread through the cloth, or any other device described in the specifications of Hezekiah B. Smith or J. J. Greenough.

But I claim, first, the employment of a wheel, o, to carry the finger L, and take up the slack of the thread on its periphery as it is drawn through the cloth in tightening a stitch, substantially as and for the purpose specified

Second, Enclosing the wheel, o, within a case, R, substantially in the manner described to prevent the thread slipping off the wheel, and to guide the slack while it is being drawn through the cloth in the production of the successive stitches as set forth.

[This improvement relates to sewing machines having needles with a point and an eye at each end, the needle passing entirely through cloth, leather, or whatever it may be, and sewing from opposite sides alternately In sewing by hand, the needle is drawn entirely through the cloth, but in common sewing machines this is not the case. To give the perfect firm hand stitch has been often attempted, but hitherto without success by a machine. These improvements in this machine for taking up the slack of the thread, &c., are designed to render this kind of sewing machine more perfect in its operation.]

COMPOUND GAGE—Albert Williams, of Philadelphia, Pa.: I claim the combination of the four several gages in one tool, and all operating on the same end of the stem, the mortise working with an anti-friction screw, the head of which is at the bottom or end of the stem.

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THERMA-PNEUMATIC SAFETY VALVE—S. H. Whitaker and Ezra Cope, of Cincinnati, O.: We do not claim generally the operation of an air valve for steam heating apparatus by the expansion of fluid bodies by heat, as we are aware that the thermo-expansive properties of quicksilver, air and other fluid bodies have been employed for this purpose with partial success.

Neither do we claim the use of beeswax or other substance of similar character for the purposes described.

But we claim the described self-acting air valve, consisting of a chamber whose top is composed of a flexible diaphragm or its equivalent filled with beeswax or other fusible substance that solidifies at atmospheric temperatures, but is expansible by heat, and that will act upon the diaphragm to open and close the passage through the combined agencies of expansion and contraction by heat, gravitation and cohesive attraction as specified.

[This self-acting valve is for steam heating radiators, to allow all the air to be expelled when the steam enters, then the valve closes. It opens again to allow air to enter when the steam is shut off, and the radiator cools, thus preventing the formation of a vacuum inside, and saving the thin metal of the radiator from collapsing.]

SEED PLANTERS—Jesse Whitehead, of Manchester, Va.: I claim the combination of the trough G, with its spout H, and receptacle J, when used in connection with a seeding apparatus, for the purpose of dividing and retaining the excess of seed from that which is to be planted, substantially as set forth.

LOOMS—Franklin Painter (assignor to the Nashuawannock Manufacturing Company) of East Hampton, Mass.: I do not claim a pattern barrel in connection with a loom; it is an old device.

I do not claim to have invented a take up motion or automatic mechanism for stopping its action, because it would be useless to me unless combined with a divided reed or some equivalent thereof for beating up properly when the take up is stopped.

I do not claim to have invented a loom, which will at the proper time form a shed on one side only of a button hole, while the rest of the warp, whether filled or unfilled, lies out of the path of the shuttle, as a loom producing that effect has already been patented.

I claim, first, a divided or sectional reed operating substantially in the manner and for the purposes set forth.

Second, I claim, in combination with such a divided or sectional reed a take up motion or apparatus, which is thrown out of action at certain periods, substantially as described.

Third, I claim a pattern barrel or its equivalent, in combination with vibrating levers, acting substantially in the manner and for the purposes specified.

Fourth, I claim an apparatus substantially such as is specified: viz., a pattern barrel or its equivalent, in combination with a primary pattern barrel, or its equivalent, arranged in such manner substantially as specified, that the former shall at proper times prevent the selection of heddles or leaves of heddles by the latter, substantially in the manner and for the purposes set forth.

Fifth, I claim a latch, substantially such as is described, acting substantially in the manner and for the purposes set forth.

Sixth, I claim a divided reel, substantially such as is described, in combination with proper mechanism for forming a shed on one side only of a slit or button hole at the same time.

And, lastly, I claim a primary barrel for selecting heddles or leaves thereof, in combination with a secondary pattern barrel for preventing their selection and vibrating levers acted upon by both barrels, or their equivalents of these parts in combination, each acting in combination with the others, substantially in the manner and for the purposes described.

PRINTING PRESSES—S. D. Learned, of Boston, Mass., assignor to A. C. Learned, of New York City: I do not claim separately any of the parts described, for they have all been used in presses under various forms of arrangement with other parts.

But I claim the reciprocating frame, B, provided with the inking and presser rollers, C D, in combination with the ink and form beds, E F, and tymphan H, provided with the rods, h n, and trisket, I, the above parts being arranged to operate conjointly as shown for the purpose set forth.

[This printing press has a reciprocating frame furnished with an inking and an impression roller, a stationary horizontal inking surface, and type bed furnished with a movable tympan. The whole operations of printing, namely, the inking of the form, the placing of the sheet on the tympan, the pressure to print or make the impression, and the throwing up of the tympan after the sheet is printed, are all performed by the reciprocating movement of the frame.]

BURGLARS' ALARMS—David Coon (assignor to himself and B. F. Chesbrough) of Ithaca, N. Y.: I claim, first, so attaching the barrel of the pistol to its stock or plate at or near the muzzle as to make a hinge joint at or near that point.

Second, I claim the combination of a spring plate, tumbler and barrel, by which the barrel becomes the hammer, constructed and operated substantially as described, so that when the pistol is properly fastened to the casing of the door, the barrel being cocked shall be at such an angle, or in such a position that the door on opening must necessarily press upon it, and thereby discharge the pistol, the contents passing outward.

PROJECTILE FOR KILLING WHALES—Rufus Sibley, (assignor to C. C. Brand) of Norwich, Conn.: I claim an improved projectile (to be fired from a gun) constructed with sheet metal wings, having journals or turning on wires or journals arranged so that the said wings may be turned down transversely or laterally on the body of the projectile, or in a recess or space made to receive them, each being arranged either parallel or inclined to the axis of the projectile as described.

CUTTING BOOT AND SHOE SOLES—Stephen Thurston, (assignor to himself, M. L. Ward and Huntington & Co.,) of Newark, N. J.: In forming the soles of shoes of india rubber, gutta percha, &c., I claim the combination and arrangement of the cutter cylinder and carrying cylinder, g, substantially as specified, the cylinder, g, being moved forward by the action of the cutters upon it, and moved backward by the eccentric on the cutting cylinder, in the manner and for the purposes set forth

TIPS FOR SUGAR MOLDS—John Turl, of New York City, assignor to Samuel Turl, of Brooklyn, N. Y.: I do not claim the substitution of the wrought iron for cast iron in making the tips of sugar molds.

But I claim the construction of the tip with a recess to receive the body of the mold, and with a conical mouth opening in a contrary direction to the regular conical form of the interior of the mold when made in the manner substantially as set forth, and for the purpose described.

SECURING NUTS ON AXLES—T. W. Williams (assignor to himself and H. T. Hoyt) of Philadelphia, Pa.: I claim securing nuts upon axles by means of the lever key, c, and the mortises or recesses, e and f, the same being constructed and arranged so as to operate together in combination substantially in the manner set forth.

DROP PRESSES—Milo Peck, of New Haven, Conn.: I am aware that the V wheels by themselves are common property, and that a patent has been granted to Henry Bushnell for operating a drop by means of V wheels, with a section of one wheel removed so as to lift the drop by means of the V wheels, and permit it to fall with its full force, and I do not claim them when used in any such manner.

I claim the combination of the male and female V wheels, with the sweep shaft d, the ratchet wheel k, the dog a, and the guard ring b, or their equivalents, so that the fall of the drop can be regulated and controlled substantially in the manner and for the purpose set forth.

I also claim the movable guard ring, c, in combination with the sweep shaft, d, the ratchet wheel, K, and the dog a, or their equivalents, by means of which the time the drop shall remain upon the anvil can be regulated and controlled, substantially in the manner and for the purpose set forth.

RE-ISSUE.

COWL OR DRAUGHT ACCELERATOR FOR STEAMERS—P. C. Guion, of Cincinnati, O. Patented Nov. 4, 1856: I do not claim any of the several devices, surfaces or parts described separately,

But I claim their combination constructively in the manner and for the purposes described and shown.

DESIGNS.

PICTURE FRAMES—A. P. C. Boute, of Cincinnati, O.

FURNACES—W. S. Bronson, of Hartford, Conn.

STOVES—Garrettson Smith, Henry Brown, and Saml. H. Sailor, (assignors to J. G. Abbott and Achilles Lawrence,) of Philadelphia, Pa.

Notes on Science and Foreign Inventions.

Explosion of a Tweer—A remarkable explosion recently occurred near Wolverhampton, England, in a furnace, by the rapid generation of gas from the escape of water through a hole in a defective tweer. The charge of metal had been nearly all drawn off; but there were about ten tuns of red hot scoria left in the furnace, when the water rushed from the tweer through a hole burned in it no larger in size than half a dollar. The water was suddenly converted into steam, which was in turn rapidly decomposed, generating a vast quantity of hydrogen gas, the force of which threw the breast of the furnace down, and forced out with immense velocity a huge mass of red hot materials, instantly killing three men, and severely injuring seven others. Let this be a caution to all the owners of smelting furnaces, that they look well to the condition of their tweers.—Had this explosion taken place before the charge of the furnace was drawn off, the results would probably have been ten times more disastrous.

Manchester Arts Exhibition.—On the 5th of last month, the Grand Exhibition of Arts was opened in the city of Manchester, the manufacturing capital of England. Prince Albert was present, and opened it with an address very flattering to the progress of the ornamental arts in Great Britain since 1851, the year of the World's Fair in London. Wm. Fairbairn, C. E., Chairman of the Executive Committee, in an address on the occasion, made a statement which redounds to the credit of the manufacturers of Manchester. The Exhibition was first proposed in March last year, and met the approbation of some of the leading men of the city, who in three weeks contributed £74,000 (nearly $370,000) to the guarantee fund to ensure the success of the scheme. A very large and beautiful building was erected for the purpose, and completely finished on the day appointed for opening. The most wealthy noblemen and gentlemen in the kingdom have sent their finest paintings to the Exhibition; some of these are of very great value, being the works of Raphael, Reubens, and the old masters. This public spirited conduct certainly does them great honor.

Long Railway Cars—A New Brake.—On the English railways, short carriages, like those originally used on our first railroads, have hitherto been employed. The greater comfort and steadiness of our improved long carriages have forced their claims upon English managers. Two new carriages, each capable of holding seventy-two passengers, have been placed upon the Lancashire and Yorkshire railway. Two of these carriages carry as many as five of the old short cars; they are 33 feet long, weigh eight tuns each, and are divided into apartments.

On this railroad experiments were recently made with a new brake on these two cars. When running at the speed of thirty miles per hour, and steam at 100 pounds pressure, the cars were stopped in a space of 110 yards in sixteen seconds. In another trial, when going at the rate of forty miles per hour, the brake was put on and the engine reversed, when the train was brought to a stand in the space of 76 yards in twelve seconds.

Engraving on Slate.—According to the *Courrier Franco-Italien*, M. Caruana, historical painter, of Valetta, in the Island of Malta, has discovered that slate is superior to wood for engravings. It is, he alleges, easily worked, reproduces the finest lines with remarkable exactness, and resists longer than wood the action of the typographical press, so that several thousand copies of a design can be struck off without producing any sensible difference in the quality of the impression.

Bleaching Malt for Pale Ale.—Mr. A. Tooth of London, has taken out a patent for bleaching malt with sulphur, which he states improves both its color and quality for making beautiful pale ale. The process of bleaching is conducted as follows: When the malt is placed in the drying room, an iron vessel containing red hot coals is placed in the room, and one ounce of sulphur for every four bushels of malt is laid on the coals. This generates sulphurous gas, which bleaches the malt in the same manner that milliners bleach straw hats. The room to conduct the operation must be very close—no seams in it to allow the air to enter. The malt is exposed to the gas for about five hours.

Splitting Rocks without Blasting.—A patent has been taken out in England by M. M. Murtineddu & Co., of Marseilles, France, for a composition to split rocks by the generation of great heat, without causing an explosion. It is composed of 100 parts of sulphur by weight, 100 of saltpeter, 50 of saw dust, 50 of horse manure, and 10 of common salt. The saltpeter and common salt are dissolved in hot water, to which four parts of molasses are added, and the whole ingredients stirred until they are thoroughly incorporated together in one mass, which is then dried by a gentle heat in a room or by exposure to the sun, and is fit for use. It is tamped in the holes bored for blasting rock in the same manner as powder, and is ignited by a fusee. It does not cause an explosion upward like gunpowder, but generates a great heat, which splits the rock. It is stated to be especially valuable for mines and clearing the foundations of old buildings. In the latter respect it may be very useful in New York city, where so many old buildings are in the course of demolition daily to give place to new and more elegant structures.

Mud Pockets for Steam Boilers.—J. Stephen of Glasgow, has taken out a patent for the following method of constructing boilers, to collect and remove the mud deposited from impure water. The boiler is formed with a narrow water space division, or pocket, extending from the underside of the boiler at the furnace down to and through the line of furnace bars. The water space opens at its upper wide end into the bottom of the boiler, which has a row of openings in its shell at that part to form the communication. The boiler itself is set slightly out of the horizontal line, the furnace end being somewhat lower than the reverse end. Hence the mud and deposit of the water is continually directed towards the front or furnace end where it falls from the boiler into the narrow bottom of the water space or pocket. The part where the deposit accumulates is carried down to a short distance below the furnace bars, so that the heat of the fuel cannot act injuriously upon the metal of the division space, and burn it where there is no water to protect it. The mud or sediment which accumulates in the bottom of the water space can be removed by an instrument put in either from the interior of the boiler, or through a plug way in the front end of the water space. Loose deposit can, of course, be blown out through the plug way by the steam pressure of the boiler. The water space, being passed down into the furnace in the center thereof, forms the means of dividing the furnace into two equal parts, so that the sections can thus be fired alternately.

Halifax Harbor.

In an address recently delivered by Judge Haliburton, of Nova Scotia, in Glasgow, Old Scotia, he made the following statement:—

"But there is one fact, not generally known; it is an important one, and I am surprised it has never yet been put forward before the public. Halifax harbor is seldomer closed by frost than any other in North America, not excepting those in the Southern States. Such an extraordinary event happens but once in many years, and then it is of very short duration. North of Halifax, nearly all the harbors are closed in winter, but the farther south you go, this obstruction occurs oftener, and lasts longer than at Halifax; the same frost that closes Boston harbor does not affect the other. Charleston, in South Carolina and Richmond, in Virginia, are repeatedly blocked up by ice, when Halifax is perfectly open; whether this exemption arises from a deflection of the Gulf Stream, caused by the Isle of Sable, or otherwise, I shall not stop to inquire. It is enough that it is an undoubted fact, and it is one which, in conjunction with other advantages, most wonderfully combined, renders this, beyond all comparison, the most valuable and important harbor in all North America."

We believe it is quite true that the harbor of Halifax is wonderfully free from ice during winter, when other harbors further south are blocked up; but it is certainly as often obstructed with ice as New York harbor, and more frequently than that of Charleston, S. C.

Syrups.

Although these preparations are so little used in England, there is no reason why they should not become a regular article in the housekeeper's store-room; they are easy to prepare, and are very agreeable to the palate, also economical, as they supersede the use of ardent spirits and wine. On the Continent it is a common practice to drink simple syrup (which is called *eau sucree*, but which we term *capillaire*,) diluted with water to the taste of the drinker.

Capillaire is made thus:—Dissolve about two pounds of the best refined white sugar in one pint of water; boil the mixture for five or ten minutes, then strain it through lawn, or a hair sieve; when cold it is fit for use.

Syrup of Cloves.—Proceed in the same way as for making capillaire, but with the sugar add thirty to forty cloves that have been broken or ground.

All the syrups of spices, as cinnamon, nutmeg, ginger, &c., can be made in the same way.

Syrups of Fruit.—These are prepared in a similar manner to capillaire, substituting the juices of the fruit in place of the water; in this way it is very easy to make syrup of oranges. Before the oranges are squeezed, to express their juice, each orange should be well rubbed or grated with the lump sugar—by so doing the fine flavor of the rind is preserved. All these syrups are drunk by diluting them with water. About a wineglassful of syrup to a tumbler of water will be found to make a pleasant draught.

Syrup of Coffee.—Take about an ounce of the finest coffee, ground, and a pint of cold water; allow them to stand together for twelve hours or more, then strain, and add one pound and a half of sugar; boil for one or two minutes, not longer, and again strain.—

Syrup of Tea.—One pint of water, two pounds of sugar, an ounce of black tea; boil together for five minutes, or rather less, and then strain. A wineglassful to half a pint of cold water makes very good cold tea.

To Neutralise the Acid (or Sourness) in Fruit Pies and Puddings.—As the fruit season now advances, it is well worthy of notice that a large quantity of the free acid which exists in rhubarb, gooseberries, currants, and other fruits, may be judiciously corrected by the use of a small quantity of carbonate of soda, without in the least affecting their flavor, so long as too much soda is not added. To an ordinary sized pie or pudding, as much soda may be added as piled up will cover a shilling, or even twice such a quantity, if the fruit is very sour. If this little hint is attended to, many a stomach-ache will be prevented, and a vast quantity of sugar saved; because, when the acid is neutralized by the soda, it will not require so much sugar to render the sour sweet. SEPTIMUS PIESSE.

Silk.

Raw silk is said to have been made by a people of China called Seres, 150 B.C. It was first brought from India A.D. 374, and a pound of it at that time was worth a pound of gold. The manufacture of raw silk was introduced into Europe from India by some monk in 550. Silk dresses were first worn in 1455. The eggs of the silk worm were first brought into Europe in 527.

Iron Ship Knees.

A regulation of the committee of Lloyd's Register comes into force on January 1, 1858, to the effect that ships which proceed to sea without being fastened with iron knees and riders prescribed by the rules, will have one year deducted from the period to which they would otherwise be entitled to be classed in the registry books.

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New Inventions.

Alloy Resembling Gold.

The following is the substance of the U. S. patent granted to Elie Mourier, and J. F. E. Vallent, of Paris, on the 3d of March last—patented in France, Dec., 1854. The alloy is called *oreide of gold*. It is formed with 100 parts by weight of pure copper, 17 of zinc, 6 of magnesia, 3·60 sal ammoniac; 1·80 of quick lime, and 9 of unpurified tartar. The copper is first placed in a crucible in a suitable furnace, and fused, the magnesia is then added slowly, then the sal ammoniac, lime and tartar separately, and in the form of powder. These are kept from the air, and well stirred with the copper for twenty minutes until the whole are incorporated together. The zinc is then added in strips or fine pieces, thrust through the crust on the top of the copper. The whole mass is then thoroughly stirred, the crucible closed, and its contents kept in fusion for twenty-five minutes. After this the crucible is opened, and skimmed very carefully to remove all the dross. The alloy thus formed is poured out into dry sand moulds if required to be rolled; if not, it may be poured into iron moulds. When remelted in a blast furnace, it is rendered more applicable for ornamental works of art.

This alloy, it is stated, is very beautiful, resembling gold in appearance—very close in the grain, ductile, and brilliant. Castings made of it are cleaned with an ordinary pickle of sulphuric acid and water to remove the oxyd. The zinc may be replaced with tin, but it makes the alloy more brittle.

Grain Separator and Scourer.

The accompanying figures illustrate the excellent improvement in grain separating and scouring machines, for which a patent was issued to Geo. Heberling, on the 20th of January last. Two machines are here represented; figure 1 being a perspective, and figure 2 a reduced vertical section of the scouring and finishing machine; figure 3 is a perspective, and figure 4 a reduced vertical section of the separator, in which the threshed grain undergoes the preliminary operations. Both of these machines employed together, clean threshed grain perfectly, rendering it fit for immediate milling. The following descriptions will render their construction and operations clear to the reader.

A represents a rectangular frame supporting the working parts of the machine; B is an inverted conical shell of cast metal secured to the frame, A. The inside of this shell is provided with teeth, spikes, or a corrugated or roughened surface. The upper part of the shell is covered by the plate, C, which has an opening, *a*, at the centre. It is also provided with the conical tubes, *b b*, inserted in it near its outside edging; any number of these tubes desirable may be used. The center portion of the underside of the plate, C, is provided with teeth or spikes, *d*, for the purpose of breaking smut balls, &c. The outer portion of this plate has corrugations, *d e e*, for the purpose of breaking the scale and dust upon the grain as it passes to the outer edge. A cast metal hollow cone, D, with its upper part, K, cylindrical, corresponding in form to the shell, B, is placed within the latter. This hollow cone is attached to the vertical shaft, E, and revolves with it; it is made smaller than the shell, B, to allow a space between them for the fans or beaters, F and G, to move clear of the teeth or spikes. The upper or top surface of the cone, D, is provided with spikes or teeth, and a roughened or corrugated surface similar to that upon the under side of plate, C, and they can be set as close together as is desirable. Upon the perpendicular sides of D, are fastened flanges, F, to act as beaters and fans for the purpose of knocking off the smut and dust from the grain, as it passes down. They also produce a blast for the purpose of carrying off the dust and smut through the tubes, *b b*, as fast as it is scoured from the grain. By this means the grain is not allowed to roll in its own dust. This is an important point in cleaning grain.

The fans, G, secured to the cone form a blast through the machine to blow the smut, dust, &c., out of the grain as fast as it is scoured from it. A constant current of air from the bottom to the top is always passing through the machine when in motion. These fans also act as beaters and assist in scouring the grain; being fastened to the cone upon an incline, they keep the grain bounding upwards between the cone and the case, B, for a sufficient time to insure its being perfectly scoured.

The beaters, F, upon the vertical sides, K, of the cone, are shorter than the fan beaters, G, and are placed nearer to each other. The outer edges of the flanges are longitudinally of a slightly convex form. A curved rim under the upper edge of the cone receives the grain as it passes form the beaters, F, for the purpose of conveying the grain to the sides of the cone, D, so that the fan beaters, G, will strike it, otherwise it would fall directly down the sides of the case, B, and would not be acted upon by the fan beaters.

H represents a fan which is inclosed in the case attached to and at one side of the frame, A; J is a spout which passes under the shell B, and is set at a slight angle to allow the grain to slide down to the opening or spout, O, as is represented. The spout, J, then projects upwards nearly vertical, terminating with a short horizontal branch. In the horizontal spout, a valve, *g*, is placed for the purpose of regulating the current of air. It is also provided with a spout, *s*, for the discharge of poor grain and cheat. *h h h h h* are plates in the vertical portion of the spout, J; they

GRAIN SEPARATOR AND SCOURER.

Fig. 1

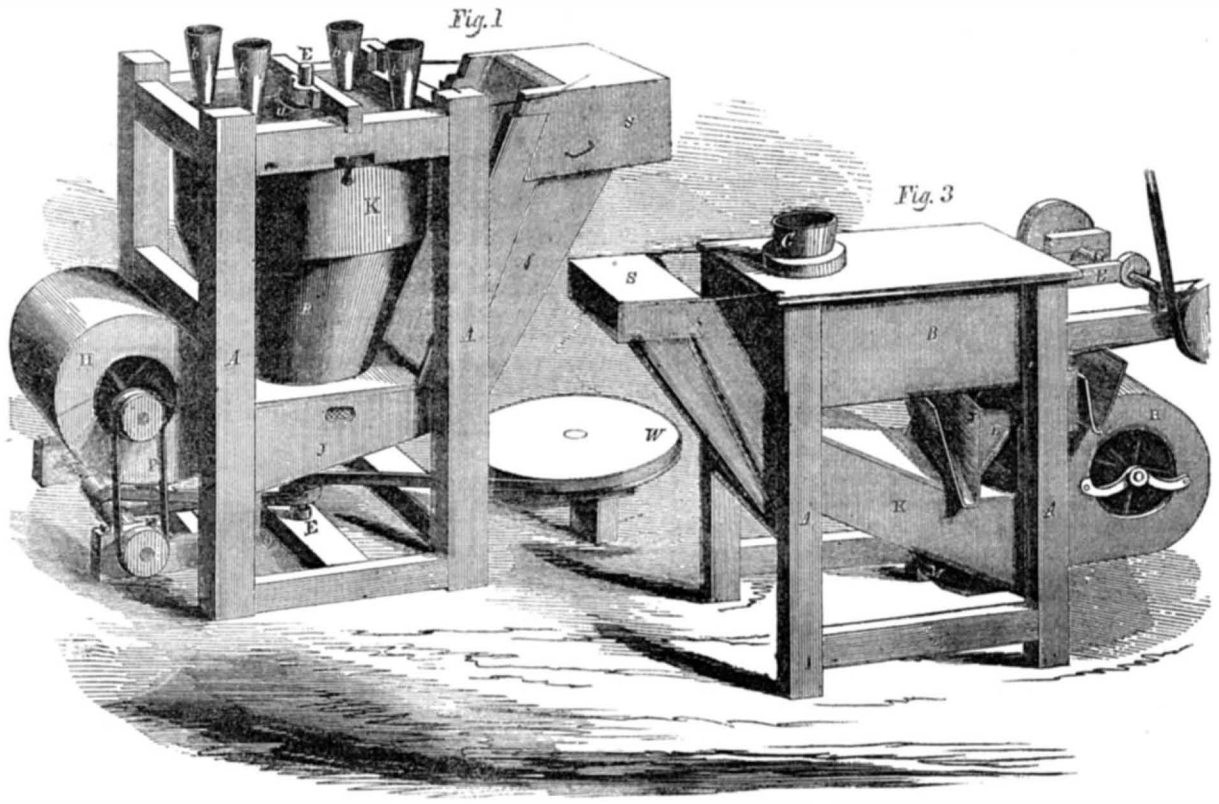
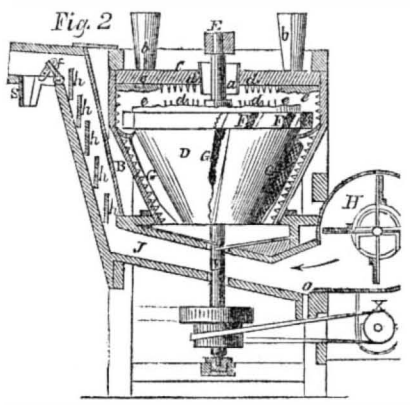


Fig. 3

are placed at an angle with said spout for the purpose of catching the light, but good grain, which would otherwise be carried out by the blast with the cheat and poor grain. All the grain that falls over these plates passes down the back side and bottom of the spout, J, and out of the opening, O, with the plump grain,

Fig. 2

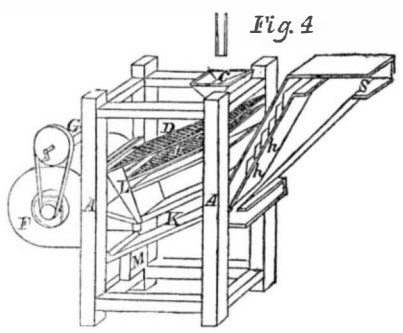


and is saved. W is the driving wheel, a band passes to the pulley on shaft, E, another from it around a pulley on shaft, X, and the belt, P, drives the fan, H.

The machine is first put in motion, and the grain to be scoured and cleaned is fed into the central opening, *a*, it then passes to the circumference between the top of plate C, and the top of the cylindrical part, K, of the cone. The teeth, *d*, break the smut balls and small straws, and the corrugated parts, *e e*, break the outer scale or coat on the grain which then falls over the edge and is caught by the fan beaters, F, and carried around until it falls upon the curved rim shown under the ledge of K. By this rim it falls under the edge of K, against the sides of the hollow cone, D, where it is caught by the fan beaters, G, which keep it bounding in the space between the case, B. and the cone, until it is sufficiently scoured. It then finds its way to the bottom and passes out into the spout, J. The reason why the grain does not pass directly down between the case, B, and cone, D, is because the beaters, E, are set at an angle which, as they strike the grain, have a tendency to throw it upwards. As the grain passes into the spout, J, it is struck by the blast from the fan, H, and the results produced as has been already described.

Figures 3 and 4.—This preliminary separarator has a coarse and fine screen; the upper one takes out the coarser extraneous matter, and the lower, fine one, separates the cockle from the grain. A is the frame of the machine; B is the separating box, and C the hopper to feed in the thrashed grain. It has two screens, D D, the upper one may be a perforated plate of sheet iron; it is attached to a jointed arm secured to an eccentric or crank on the driving shaft, G. When this shaft revolves it gives the upper screen, D, a reciprocating shaking motion, the finer matters than the straw, chips, &c., pass through, while the straw is drawn back and discharged at the conduct spout, I. The lower screen is very fine, and will not allow the grain to pass through it, but smaller seeds, such as cockle, &c., will pass, thence out of spout, J, thus separating the finer seeds from the grain. The wheat passes over the top of this screen down the conductor, L, to the spout, K, of the fan, F, where it meets with the current of air, and is there separated from the chaff, then

Fig. 4



falls down through the conductor, M, to the floor. The light grain, and chaff, and dirt are blown up the inclined spout and discharged at S. The inclined shelves, *h h*, are the same as those in figures 1 and 2, and effect the same objects.

The two machines may be placed conveniently together in any part of a mill. The coarser impurities are separated from the grain by the machine last described, and the grain is finally scoured and cleaned in a most perfect and ingenious manner ready for grinding, by the machine first described, no other machinery being required for this purpose.

Messrs. Heberling & Campbell, Quincy, Ill. manufacture these machines, from whom more information may be obtained by letter.

Self-Weighing Carts.

Two of the self-weighing carts, illustrated on page 129, this Vol. Scientific American, are now used in this city by J. K. Olivine, coal merchant, No. 377 Water street. They were brought to the door of our office on Thursday last week by Messrs. Rothermel and Martin, of Philadelphia, to show us how really useful they are in practice. Quite a crowd was attracted around them to witness their opera tion, one being loaded, and the other empty. Various persons jumped into the empty cart to get weighed, in order to test its accuracy, and it operated so correctly that the difference of a few ounces turned the beam on each occasion. There was a tun of coal in the full cart, and Mr. Martin, with but little effort, weighed it accurately, by simply turning a short lever.

Various persons present asserted that coal merchants could deceive with such carts just as well as without them, by constructing them to do so. These objections were easily removed by stating that if a person suspected he was cheated in the weight of his coal, he could easily jump into the cart and weigh himself, and if it weighed him correctly it certainly would weigh the coal equally as satisfactorily. Such carts afford the means to every person to satisfy himself as to the weight of coal, or any material or article he may have purchased, when conveyed to him in such a vehicle. They are not only very useful for coal carts, but other purposes, especially for conveying such articles as bar iron, which requires a great amount of handling to weigh it in scales, all of which labor may be saved. Several carts of this description have been in use in Philadelphia for a number of months, and have proven to be durable and reliable. They weigh as accurately to-day as when first constructed and used.

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Scientific American.

NEW YORK, JUNE 6, 1857.

The Triumphs of Engineering.

To what extent human judgment and combined labor are capable of overcoming natural difficulties, can probably never be definitely answered. The terrific storms in Atlantic navigation have long been encountered as commonplace affairs by hundreds of gigantic ships which plow its surface. The rapids of Niagara have been bridged both above and below the falls, and while on the former the traveller leans on the wooden rails within a few inches of the madly leaping torrent, anxious to hurry him over the precipice a few yards below, on the latter he depends on wire cables thirteen inches in diameter, and gazes down over 200 feet into the solemnly sweeping and unfathomable channel of by far the greatest rapids in the world. With a silken bag of gas encased in a light net work of rope, Lussac and Biot ascended into the ethereal blue higher than even the condor of the Andes, and snugly sleeping in a first class car, men travel faster than even the carrier pigeon. An artificial river in this State bears the food of a nation from the chain of inland lakes to the seaboard, and artificial dykes and pumps in Holland protect and render valuable whole districts lower than the sea. Similar dykes or continuous dams in Northern Italy, increased in hight and strength with the gradual rise of the water in each succeeding century, have elevated the river Po until its surface is above the roofs of the neighboring houses, and at the present moment the Ganges canal in India is carrying a large portion of this sacred river in a volume 150 feet wide, across valleys and over mountain torrents, and discharging more than 6,000 cubic feet per second of the invigorating fluid for the irrigation of a suffering country. Man defies the power of the hurricane to destroy his ships, and builds miles of massive breakwaters to protect his landings. He enchains the water-fall and compels it to work in his behalf, and molds and directs the rivers at his bidding. Encased in armor and supplied with air by pumps, he dredges the deep streams of California for precious metals. Armed with nothing but the meanest implements of labor, and with but a simple lamp of oil in his cap, he gaily travels through dripping passages under even the ocean itself, picking and hauling to the coast of Britain the ores of iron, or extracting and pouring on the coast of Nova Scotia dark lumps of the almost equally necessary coal. Standing in the bright sunshine of St. Louis he bores perpendicularly nearly half a mile into the solid earth for springs, and coolly calculating the exact value of labor and materials, he leads a river on gigantic arches over the masts of shipping in Harlem, to supply New York with drink. He hauls trains of loaded cars not only over but *through* magnificent mountain chains, making double-tracked and full-sized railroad tunnels in this country and Great Britain over a mile in length, and is attempting in Europe, at the Soemmering mountain, a tunnel which, if we recollect aright, runs about thirty miles in the bowels of the earth.

In the face of these facts it seems idle to argue that it is absolutely impossible to connect the streets of cities by passing under navigable rivers, wherever the object shall be deemed sufficiently important to induce a really serious contemplation of the subject. Chicago, for example, which contains in its heart a narrow river, the drawbridges of which are necessarily much open, might be very greatly benefitted by one or more tunnels. The uniting of this city with Brooklyn is a problem which, it must be confessed, presents quite serious difficulties, but they can be overcome. The river is deep, and the bottom, judging from the character of the formations on each side, is compounded of hard rock and quicksand, a combination about the worst which could be conceived for tunnelling, but were the formations carboniferous, underlying even rock as hard as this, tray-shaped cars drawn by scrubby-looking donkeys, and guided by greasy boys, would be at this moment scampering, even if necessary, at several different subterranean levels, from Manhattanville to Fulton avenue. Tunneling in the rock is by no means necessary, however, with the present perfection in the manufacture and use of iron, and in inviting special attention to the project on the first page, we are but conferring a favor on the many thousands, rapidly increasing perhaps to millions, who are directly and at times very deeply interested in the solution of the problem.

This metropolis manufactures almost every article named in the dictionary, and imports, distributes, and collects for exportation, over half the commercial materials in our extended foreign commerce. It contains more inhabitants than all Connecticut, without counting its business men who live in its environs. But New York is only a workshop and a salesroom, Brooklyn is to a great extent the sleeping apartment where the tired workmen and clerks retire to rest. We are not alone in insisting on the imperative necessity of an intimate and reliable communication between places thus intimately related. Reckoning each man's time at the price of his ordinary labor for a corresponding period, the cost to the community, of the ice and fogs which now obstruct the ferries, is sufficient to repay, in a very short time, all that can reasonably be expended in the enterprise. One of the schemes most urged before the authorities for the solution of the problem, is to inclose a sufficiently wide space half across the river in an immense coffer dam, and to pump the water from the area thus inclosed, so that one end of a tunnel may be excavated at leisure while the river flows as usual in the other half of its channel, after which the dam is to be removed and the other side inclosed. If anything were necessary to convince our readers of the demand for a tunnel in some form, the fact that such an extraordinary proposition has been seriously entertained would most amply supply it. To say nothing of the obstructions of the river and the results in deposits, etc, to be apprehended therefrom, the engineering difficulties of constructing a coffer dam of such dimensions, and in such a depth of water are immeasurably greater than those of laying the tube here presentcd, serious as the latter must be acknowledged to be.

Steam Cultivation.

The cultivation of the soil by the power of steam, instead of by animals, is a question which has forced itself upon the attention of our farmers in the Western States, where there are broad prairies and very large farms. This subject is one of great and growing importance, so much so that Mr. Bronson Murray, of Illinois, as set forth in previous numbers of the SCIENTIFIC AMERICAN, has advised his brother farmers to contribute and offer a reward of $50,000 for a practical steam plow that will prepare the soil more rapidly, even if the cost of plowing should be equally as great as by horses, the saving of time being the grand object where spring weather is of short duration. In hilly regions and for small farms the steam plow is out of the question; it can never overcome the *up hill work* in the one case, nor be profitably used on small farms in the other. But on large farms containing several hundred acres of comparatively level land—such farms as are very common in Indiana, Illinois, and other States—and where there is plenty of cheap fuel, we believe that steam plowing will yet become general. Looking at the question on all sides, we do not see a solitary objection worth a straw as to its practicability. There are many dolorous, doubting individuals, who will doubt its payability, or utility, but there have always been such persons, and the world will never be without them; but let them doubt as they may, the steam plow will yet be a successful reality, we believe.

Some persons have inquired of us, "what are the difficulties in the way of steam plowing on the prairies," and a correspondent from Mobile asks, "is it the want of traction in the wheels of the locomotive plow." The latter can never prove a source of difficulty to its success; in fact, we do not know that there is a single difficulty in the way but one, and that is the want of spirited persons to make experiments. If Mr. B. Murray, and the farmers of Illinois who are interested, would subscribe $50,000, and employ a competent and reliable engineer to build a steam plow for the purpose of experimenting, we believe that this sum would be sufficient to test the question, find out all the difficulties, and make such alterations of machinery as would overcome them, and at the same time leave enough of funds to build a steam plow as the final result, that would meet every reasonable demand.

We are not aware that a single experiment has ever been made with steam plowing in our country; it is far otherwise in England, where wealthy landlords have not spared expenses to bring about such a desirable system of cultivation. Some very recent trials with steam plowing on Lord Hatherton's estate in Staffordshire appear to have been very successful, according to the account of them in the London *Engineer*. An engine of eight horse power plowed eight acres in one day, and put it into far better order, and at less expense than could be done by the common plow and horses. The engine was portable, but was kept stationary in the field while the plow was drawn by an endless wire rope passing around a windlass, and over standards. The whole cost of the engine, windlass, and apparatus was only £400—about $2,000. This system of steam plowing is held to be the most economical; it is asserted by its advocates that there is a great waste of power in the locomotive plow to draw the weight of the engine over the field, all of which is economized in keeping the engine stationary, and the plow only moving. This is no doubt true; it saves power, but requires a great amount of apparatus, ropes, belts, windlasses, turn tables, and standards, to carry it out, and only a small portion of a large field, (circumscribed in length by the endless drag rope) can be plowed at once. This, however, is not a serious objection, because a large field may thus be plowed acre by acre as well as by taking in long and extensive landings at one continuous operation. We are extremely partial to the locomotive plow moving over the field and dragging a gang of plows at once—plowing up five or six furrows. With broad, flat wheels, such a steam plow may be rendered successful, and the engine used (when not required for plowing) for threshing, grinding, corn shelling, and various other purposes. It is certainly the most simple plan, and simplicity is one of the main points desirable in all agricultural machines.

On a former occasion we directed attention to this subject, and we have returned to it again in order to incite farmers to plowing experiments, which may be conducted from this period up to the month of next November or December. Parties interested in mechanical improvements relating to agricultural machinery, consider it to be a question of vast importance, and exhort us not to let it sleep until it is completely resolved.

Grand National Trial of Harvesting Machines.

A grand national trial of harvesting machines, under the charge of the United States Agricultural Society, will take place at Syracuse, N. Y., from the 6th to the 13th of next month (July). The next annual fair of this Association is to be held in Louisville, Ky., in September, but as that period would be too late in the season for a trial of mowers and reapers, the committee chosen to test agricultural implements have appointed this trial. The Society has engaged Mr. Joseph E. Holmes, of Newark, Ohio, so well known as a practical and scientific mechanic, to superintend the trial properly. The citizens of Syracuse have in a most liberal manner offered the officers of the Society every accommodation, and all the pecuniary assistance necessary to carry out their objects. A large number of entries have already been made for this trial, which it is believed will be the greatest that has ever taken place anywhere. The committee has issued a circular which gives assurance that the trial will be a very thorough one. The draft of each machine will be tested by a dynamometer. After a thorough testing the prizes will be awarded as follows:—

Reapers.—First, Grand gold medal and diploma. Second, Large silver medal. Third, Large bronze medal.

Mowers.—First, Grand gold medal and diploma. Second, Large silver medal. Third, Large bronze medal.

Reaper and Mower combined.—First, Grand gold medal and diploma. Second, Large silver medal. Third, Large bronze medal.

Automaton Raker.—Transferable from one machine to another. First, Large silver medal. Second, Large bronze medal.

Clover and Grass Seed Harvesters.—First, Silver medal and diploma.

In addition to these will also be trials of other harvesting machines, and the following prizes awarded:—

Hay Rake.—First, Silver medal and diploma. Second, Bronze medal.

Tedding Machine.—First, Silver medal and diploma. Second, Bronze medal.

Hay Press.—First, Silver medal and diploma.

Hay Pitching Machine.—First, Silver medal. Second, Bronze medal.

Implements—Three grain cradles, bronze medal. Six hand rakes, bronze medal. Six hay forks, bronze medal. Six grass scythes bronze medal. Six cradle scythes, bronze medal. Scythe snaths, bronze medal.

On a former occasion we blamed, and justly too, the National Agricultural Society, for devoting so little attention to improvements in agricultural machinery; we now take pleasure in commending the spirit which prevails in the councils of its managers. They have now adopted just and rational measures to bring out real solid improvements in agricultural engineering; and we are glad to see that they have not overlooked the small machines, the cradles, rakes, scythes, forks and snaths, for these will never go out of use—they will always be required for certain farms.

Those intending to exhibit machines should give notice either to Mr. H. S. Olcott, Westchetser Farm School, Mount Vernon, N. Y., or to Mr. Holmes, at Newark, Ohio, before June 15th.

It must not be forgotten by our farmers that there will also be a grand general trial of all kinds of agricultural machines and implements that can be tested at the annual fair at Louisville.

Maryland Reaper Trial.

The Maryland State Agricultural Society is to have a grand trial of reapers, mowers, and kindred machines during the latter part of this month—about the 26th—on the farm of Judge E. T. Chambers, near Chestertown, Kent Co., Md.

The Society has provided liberal premiums as an incentive to inventors on the occasion, the first being $100 for the best reaper and mower combined, without a self-raker; and the second $75 for the best reaper, with self-raking attachment. The other premiums are, best mower, $50; best reaper, $50; best automaton rake, $30; best implement for gleaning wheat fields and raking hay, $20; and best implement for gleaning wheat, $15. Discretionary or second premiums, in addition, will also be awarded to the amount of $150 for other machines or implements.

American Crucibles and Composition Molds.

On another page Mr. T. Hodgson, of Brooklyn, advertises that he has invented a new kind of plastic material, capable of making molds for all kinds of metal castings, iron, copper, brass, &c., which can be used repeatedly, over and over again. We have been furnished with a sample of these molds, and some specimens of iron and brass cast in them. The castings are very smooth, and have a remarkably fine skin. He has also left samples with us of improved crucibles, made of materials quite common and cheap. They are capable of withstanding a very intense heat, and of concentrating it in a superior manner upon the metal to be smelted.—Iron ingots have repeatedly been smelted in the same crucible, and it appears to be more durable than the best foreign articles of this kind. Crucibles and molds are of great consequence to founders and metallurgists, and the inventions described promise to effect a decided improvement in smelting and molding.

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[For the Scientific American.]

The Divining Rod.—A Theory.

Were all the world blind, and it should be discovered that plants would grow better in the open air than in an equally warm and well ventilated cellar, it would be impolitic to ignore the facts and contend that there could not be some mysterious influence termed sunshine which we knew little about. Were all mankind perfectly deaf, and it should be found that concealed birds and animals, by opening their mouths and pouring out their breath could convey signals to their companions at a distance, it would be unwise to assert that there could not be such an agent as sound, and such a sense as hearing. And by the same reasoning, if all mankind, or the mass thereof, are unconscious of sensations which some give direct and positive evidence of possessing, it is true wisdom to collate, sift, and compare facts, rather than to reject them without examination. It might be weak to avoid expressing an opinion, but to decline receiving evidence would be stupid. The course taken by your valuable journal in inviting evidence from all quarters in relation to the divining rod, and at the same time modestly arguing that it is probably a delusion, is the only true one for a journal seeking to diffuse scientific information.

From the mass of information previously on record, together with the evidence of several intelligent correspondents of your journal, it seems undeniable that honest and illiterate persons, little likely to possess any extraordinary geological acuteness, have been able to determine by this aid, the location both of water channels and metallic substances.—This may be mere chance or shrewd guessing, but it requires less credulity to ascribe it to an increase or diminution, in short, a *disturbance* in some manner of the electrical or magnetic influences to which some unhealthy or peculiarly developed individuals are peculiarly sensitive.

The divining rod seems to be simply a very ingenious and efficient means of rendering sensible any very slight disturbance of the muscular strength. It appears that witch hazel, apple tree, whalebone, and very likely every other substance of a proper form, will answer the purpose, if it is delicately held with the hands in an unnatural and strained position and the muscles are allowed to become a little tired and ungovernable. In this condition a peculiarly sensitive person would be very likely to give it some slight movement when unconsciously affected either by the electrical current due to the friction of running water, or by the magnetic disturbance due to the vicinity of metallic masses. It is immaterial what this movement may be; so long as it is by the motion of the rod made apparent to the eyes of the person holding it, or to those of surrounding individuals, it fulfils its object, and whether designated as "divining" or "diving" rod, "galvanometer," or "humbug," may prove to be worthy of quite extensive employment. It is simply necessary to find a person extremely susceptible, and not accustomed very closely to examine and analyse his sensations, and by this theory all the necessary conditions are fulfilled, and a first rate diviner is at once obtained in any locality. The connection between the mind and the muscles, whether voluntary or involuntary, is mysterious; and if it is granted that the muscles can ever act without the cognisance of the will—an event which occurs as often as the heart beats—it is easy to reconcile the assumption that the movements are purely muscular with the strict integrity and sincerity of the operator.

There are those, and possibly a very large number, who are so far susceptible to magnetic influences as to sleep much better, and to recover from prostration by sickness much quicker when lying with their heads to the north, a fact which, of itself, is worthy of particular notice, and of extensive publication, but is here only referred to as corroborative of my theory that very slight influences of this kind may affect the animal organization. I know a person who for a long period habitually handled metals, particularly copper, through the medium of a piece of paper or cloth, on account of the disagreeable sensations produced by contact with the skin. Baron Von Reichenbach's "Dynamics of Magnetism" gives scores of instances where individuals have been found quite powerfully affected by these and other agencies, of which less refined or less diseased persons are utterly unconscious; and although I still ascribe to imagination and too great credulity many wonders affirmed concerning the subject, I am ready to believe that it is within the known powers of electrical and magnetic currents induced by so slight causes as those in question to perform all that is generally claimed for the divining rod.

The chief facts which this theory does not attempt to explain seems to be those affirmed that the rod has really and strongly *bent*, even so much as to twist itself off when firmly held over the running water. Can this be purely fabulous, or the result of imperfect observation, and a lack of scientific accuracy in tracing the relations between cause and effect?

The theory here advanced seems capable of explaining *nearly* all the phenomena connected with the subject. The involuntary action of the muscles not only of the heart, but of what is termed the locomotive system, such as the hands, etc., is distinctly recognized by Dr. Marshall Hall in his lectures as a "reflex action" of the nerves. If this theory is correct, I should fancy that the same persons who could divine would be likely to be mesmeric subjects, spiritual mediums, clairvoyants, &c., and *vice versa*. It might be worth while for some of the many thousands of such susceptible individuals to try their hand at this practical method of making their peculiarity valuable.

New York, May, 1857. T. D. S.

Divining Rods and Lightning Rods.

MESSRS. EDITORS—Noticing an article in one of your late numbers on the use of the divining rod, and another on lightning rods, I will give you my views on these subjects. While you doubt the virtues of the divining rod, your correspondent, J. A. Wise, doubts the virtues of lightning rods; but, believing fully in both, I will state a few of the reasons on which that belief is founded. It is well known that there are veins of water in the earth passing in various directions, and seeking outlets in the form of springs. If wells are sunk to these veins, they will contain *living water*. Now, in the hands of some persons, the divining rod when carried over these veins will dip, pointing down to the earth.

This has been proved, first, by finding such veins running in the direction pointed out: second, by marking the place where the rod dips, and afterward taking the operator blindfolded over the ground, having first, by leading him in various directions, made him loose his knowledge of the locality: third, by closely watching the action of the rod itself. I have seen the rod actually twist in order to dip, both ends being held so firm that it could not dip without twisting: fourth, by the fact that a skillful operator in Massachusetts has been called upon in hundreds of cases to locate wells in the vicinity of his residence, and has even been known to go two hundred miles for that purpose, and I never heard of his failing.

There are many in whose hands it will act, though but feebly, and consequently with a good deal of uncertainty. It appears to be a natural gift, but susceptible of much improvement by practice. Your correspondent is mistaken in saying the rod must be of the sweet apple tree. Formerly it was said that it must be the witch hazel. The best operators say any green rod of the proper shape will answer. Whalebone is also good. You ask what is the cause of this remarkable action of the rod? I answer electricity. Spread a silk handkerchief on the ground where the rod dips, and it will cease to act? But why does it act over those veins of water, and not elsewhere? Because there are currents of electricity continually passing to and from those water veins which in some way affect the rod. That electrical currents do exist may be strongly inferred, if not proved, by the fact that certain buildings, trees, &c., have been repeatedly struck by lightning, and this leads me to the subject of lightning rods.

That *they* do not always afford protection, I have no doubt, is owing to defective construction or application. Lightning does not fly about at random as Mr. Wise seems to suppose. No element in nature is governed by more simple and perfect laws. When it descends from the clouds to the earth, it has a particular spot which it seeks in preference to all others, and that spot is where its opposite fluid is. This spot it will seek by the best conductors in its way. Water is doubtless the best conductors in the earth. If the lightning rod leads the fluid direct to one of these streams, it will not leave it except at its termination. One gentleman who has examined upwards of fifty cases where the lightning left the rod, says: "I have not found an instance of failure where Franklin's directions have been strictly followed. In almost every instance the defect was in the termination of the rod." It did not lead the lightning where it wanted to go. The same gentleman, (Professor Reed, of Mendon, Mass.,) has examined nearly a hundred places where flash lightning has entered the earth, and has not found an instance where the divining rod did not indicate a vein of water underneath.

We can readily see, if we suppose a house situated by the side of one of these conductors and the lightning rod leading to the ground on the opposite side, a good cause for its leaving the rod and taking a short cut by the best conductor to its final destination. If properly constructed and placed, the testimony of both science and experience establishes the truth of their safety. A blacksmith in New Haven has within the past thirty years put up two hundred rods, and no building on which they were placed has been injured or any of its inmates harmed. A scientific gentleman in Massachusetts has erected upwards of one thousand within the past twenty-five years, with the guarantee that the cost of the rod should be refunded in case of damage by lightning. No application for refunding has ever been received.

To be safe, the rod should rise above the highest part of the building, kept well painted (black) to avoid rust, and the part enter in the ground should be copper. It is well to gild the point, but above all, let it terminate over one of these natural conductors in the earth. C. O. READ.

Perth Amboy, May, 1857.

[These two letters are published, because they advance new views respecting a question which seems to be of very general interest. We have had sufficient statements and assertions made by eye-witnesses in regard to the action of the divining rod to leave no doubt of the reality of some peculiar action in its use. What is the cause of that action?

Our two correspondents have advanced similar opinions respecting the cause of the divining rod indicating the presence of water beneath the surface of the ground, but only one fact is given in support of the theory of electrical action in the case. That fact is the placing of a silk handkerchief (which is a non-conductor) on the ground over which the divining rod has moved, when it ceases to act, as has been stated by Mr. Read. But, supposing it to be perfectly true that veins of living water under the ground do contain a great quantity of the electric fluid, how according to the known laws of electricity will the rod be effected in the manner described? And how can two different rods, such as a green bow of hazel, which by its moisture is a tolerable conductor, and a piece of whalebone, which is a non-conductor, exhibit the same effects? Here there appears to be a contradiction.

Setting Artificial Teeth.

MESSRS. EDITORS—Can you furnish information relative to the different modes of making and supplying artificial teeth, the most reliable, permanent and durable; and at the same time to render the appearance of the gums quite natural and comely. Doctors differ in this respect, and recommend different kinds of work as the best and most reliable modes of practicing dentistry.

A particular friend procured the extraction of her natural teeth, preparatory for a full new artificial set of the continuous porcelain gums, which was then highly recommended by the dentist who extracted the teeth. He now, from some cause, perhaps because he cannot make them, is recommending the old plan of setting upon gold plate, and discouraging the other method as having proved to be a failure in many instances. C.

Hamilton, Ill., May, 1867.

[To definitely answer the question "Which is the most reliable process in the art of dentistry; that which proves to be the most durable as well as beautiful?" is a delicate task; it almost amounts to a difference only in the skill of different operators, and the peculiar characteristics of the case requiring treatment. A few remarks upon those modes of practice which are worthy of attention may lead to a better understanding of the subject.

The oldest plan now used is the setting of separate porcelain teeth (which have been made by casting in molds) upon a gold plate. In mouths which do not require any peculiar restoration of features, only a uniform fullness in place of that lost by absorption, and when the artificial gum will not be exposed when in use (thereby showing the joints or seams up through the gum between the teeth) this mode, in the hands of a very skillful dentist, will be a very successful one—easy of repair in case of accident, and useful for the patient.

The next plan in order of use is the making of porcelain teeth with a continuous gum by carving, called block teeth, and setting upon gold plate. The advantages of this plan over the last are, no exposure of seams in the artificial gums, a perfect restoration of features given, by carving any peculiarity required, a more agreeable feeling to the tongue upon the inner surface, &c.

The only additional plan worthy of notice is the setting of single porcelain teeth without gums, upon a platina plate, and packing between and around the base of the teeth a mineral compound, and fusing it, forming an artificial gum, commonly called "Allen's continuous gums." The advantages claimed are similar to those gained by block teeth, together with no possibility of a lodgment for foreign particles between them and the plate. Its greater solidity is also claimed for it as an advantage, but by some who have used it most it is asserted that it is so perfectly unyielding in use it breaks more readily than any other work.

The handsomest, and, we believe, as good work as we have ever seen, were block teeth mounted on twenty carat gold plate. We have made no allusion above to the newly patented "cheoplastic work," as at present it appears too much like pewter to be either serviceable or long-lived.

Hollow Walls Again.

MESSRS. EDITORS—On page 291 of the present volume of the SCIENTIFIC AMERICAN, I notice a few remarks on hollow walls. The only objection to the sort spoken of in the article before me is that of the two walls being connected with *brick* binders, which, in my opinion, would conduct the moisture in some degree to the inner wall. There is a house on the Hudson, about a mile and a half north of this city, in the process of building, the walls of which are hollow, and constructed as follows:—

The inner wall is eight inches thick, and bound together with chestnut blocks, painted with coal tar to preserve them. The main object of the wooden binders is to fasten strips for nailing the clapboards which is going on outside. This novel mode of building, which comprises both the appearance of a country house and the comfort of a city one, I hope will suit the fancy of some of your numerous readers. F. K. S.

Poughkeepsie, May, 1857.

[The binder bricks might be coated with coal tar, or varnish, just as well as chesnut blocks to keep out the moisture, but they would not answer, of course, for nailing clapboards on them.

The Hoosic Tunnel.

The Boston *Transcript* says that some 700 feet of the Hoosic tunnel have been excavated—521 on the eastern side of the mountain and 185 on the other. The progress made per day is about six feet. In the execution of the work about 100 workmen are employed on both sides of the Hoosic.

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R. & P. of Ky.—We returned your money and advertisement, for the reason that we consider all such announcements as a "humbug," and we do not wish to be the medium for disseminating information of such doubtful importance even in our advertising columns. Patent medicines or cosmetics of any kind cannotbe advertised through our columns.

L P., of Del.—Your engine operates precisely on the principle of Hornblower's engine, patented in England about the year 1790, and since known as Woolf's engine. Thus you see you are a long way behind the time.

W. D. F., of N. Y.—Ice has been made artificially in this city, by allowing compressed air to expand. Mr. H. E. Roeder was engineer of the experiments. The method of effecting the same result by the evaporation of ether in a vacuum was tried at the Cuyahoga Works, Cleveland, O.

M. H., of Pa.—We do not know who manufactures the best machines for grinding and preparing sumach for tanning purposes.

A. W. A,, of Pa.—It will be necessary for you to send us another sketch and description of your gate, as we did not preserve the one sent without your signature.

C. P. E., of N. Y.—We do not know of any institution in this city under the title of "Reformed Medical College."

J. W. Houghtelin, of Walnut Grove, Knox county, Ill., wishes to purchase a hominy mill of the most approved make.

C. B. J., of Wis.—The Office will not permit you to cover all the different devices your model shows, under one application, but will permit the same model to be used for the several distinct applications that will be necessary to make to cover your several devices.

L.R. H., of N. Y.—A great many modifications have been made on steamboat paddle wheels intended to avoid the lifting of water as the paddles come out of it. They have met with very poor success.

G. & B., of ——.—Ornamental bricks for building purposes are quite old, and are now employed in Europe.

J. L., of C. W.—If you can make your steam pleasure boat run at the rate of nine miles an hour with a cylinder of 3 inch bore and 6 inch stroke turning 5 feet wheels, you will accomplish a herculean feat. If the boat displaces only 1 square foot of section, no less than 47,520 will have to be displaced in running 9 miles, amounting to 2,970,000 pounds. Your engine cannot do it, in our opinion.

J. H. E., of Iowa.—It has been proposed to use glass for mold boards for plows, and if we mistake not, there is already a patent in existence for it. Iron does not answer for prairie plows. Steel is most generally in use, we believe.

W. J. H., of Ill.—You do not appear to be aware of the fact that iron bedstead fastenings are very common. The device you suggest for this purpose is at least ten years old. You do not describe the spring mattrass, therefore we do not know what it is.

F. G., of Ill.—Your plan for navigating the ocean by constructing the whole outer portion of a vessel water tight, and making the shell of it one continuous screw, fore and aft, is not new. See Frost's plan, illustrated in a previous volume of the Scientific American.

J. L. P., of Pa.—Your method of impregnating timber with an antiseptic liquor is not new. A French invention embracing the same principle will soon be illustrated in our columns.

M. N. M., of Va.—Multiply the quantity of water in pounds which issues from the gate per minute into the hight of the fall in feet, and divide by 33,000, and you will have the horse power of the water; deduct one-third of this for loss, and you have the power of the water wheel. This is the rule, but it is impossible to tell the real power of a water wheel without testing it by a dynamometer.

B. F. W., of Ga.—Your floating balloon lightning conductor is a novel and ingenious project, and will prevent disruptive discharges of lightning, if you can make it withstand the severe gales of wind which generally accompany thunder storms. We believe it will be very difficult for you to make it perfectly practicable.

C. L., of Conn.—We never heard of a case of phosporus being formed in the vault of a sink before the one to which you refer. It must have been separated from the excrementary matter by the lime, or perhaps the copperas, which you have employed as a disinfectant, but not the charcoal. We do not wonder that persons were alarmed by seeing smoke issue from the vault. By covering its surface with earth you have only provided a partial remedy.

C. C. H., of Mich.—Are you sure that the vapors of arsenic produce the same symptoms as those exhibited by persons affected with the National Hotel disease?

B. F. M., of Wis.—We cannot tell you the amount of power you lose by wire-drawing the steam; you can easily find out by putting an indicator on the cyl inder.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, May 30, 1857:—

C. F. H., of Pa., $10; A. C. R., of Conn., $10; B. & McC., of Va., $30; H. W., of Vt., $25; J. P. R., of Pa., $250; J. F. R., of Iowa, $25: B. C. Van D., of O., $40; J. H., of N. Y., $20; M. & W., of O., $30; L. T., of Ala., $250; W. H. W., of N. J., $50; E. K., of O., $35; I. A. R., of Mass., $32; R. S. J., of Conn., $30; J. V., of Pa., $25; G. S. C., of Ill., $20; W. W. D., of Cal., $250; M. J. F., of N. Y., $50; J. G., of O., $25; J. McI., of Ill., $25; G. D., of Ill., $30; R. L., of S. C., $10; D. R. & M., of N. Y., $100; C. & C., of Mass., $20; J. F T., of S. C., $25; D. & D., of N. Y., $25; G. B. M., of Ala., $30; E. L., of N. J., $30; J. H. P., of N. J., $25; P. A. S., of N. J., $25; E. B., of N. J., $25; B. H., of N. Y., $57.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, May 30, 1857:

J. B., of Ill.; H. W., of Vt.; A. C. R., of Conn.; C. F. H., of Pa.; J. H. P., of N. J.; C. N. L., of N. Y.; P. A. S, of N. J.; W. H. W., of N. J.; G. S. C., of Ill.; J. F. R., of Iowa; J. A., of Mich.; J. G. of O.; I. A. R., of Mass.; E. B., of N. J.; J. V., of Pa.; J. McI., of Ill.; J. F. T., of S. C.; D. & R., of N. Y.; C. & C., of Mass.; B. H., of N. Y.

Literary Notices.

AMERICAN ENGINEERING ILLUSTRATED—We hail with satisfaction every new work, well executed, relating to American mechanic arts. G. Weissenborn, C. E., 131 Fulton street, this city, has appeared as a claimant for the public favor of our engineering community in the the production of a work under the above title. Three numbers of it have been issued, and they certainly afford evidence that it deserves a wide and general patronage. The drawings are upon a large scale, and are very clear and full, the details being perfectly legible, and the lines clear and distinct. Two of the numbers contain full drawings of the steam engine, force and lifting pumps of the New York Steam Sugar Refinery. The engine was built by Hogg & Delameter, this city. The other No. contains drawings of the oscillating marine engine, built at the Novelty Works for the steamship Knoxville. The work will embrace large and detailed engravings of various machines, &c., connected with the mechanical arts in our country. Locomotives, printing presses, saw mills, rolling mills, grist mills, &c., will be illustrated and described. Price $1 per number.

MUSPRATT'S CHEMISTRY.—Part 28 of this admirable work is just issued by C. B. Russell & Bros., Tremont street, Boston. Its contents relate to fuel, its nature, uses, &c.

Important Items.

☞ COMPLETE SETS OF VOLUME XII EXHAUSTED.—We regret that we are no longer able to furnish complete sets of the present volume. All the back numbers previous to No. 27 are entirely exhausted.

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Private consultations respecting the patentability of inventions are held free of charge, with inventors, at our office, from 9 A. M., until 4 P. M. Parties residing at a distance are informed that it is generally unnecessary for them to incur the expense of attending in person, as all the steps necessary to secure a patent can be arranged by letter. A rough sketch and description of the improvement should be first forwarded, which we will examine and give an opinion as to patentability, without charge. Models and fees can be sent with safety from any part of the country by express. In this respect New York is more accessible than any other city in our country.

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An engraving of the device for accomplishing this result, will be published in our next number.

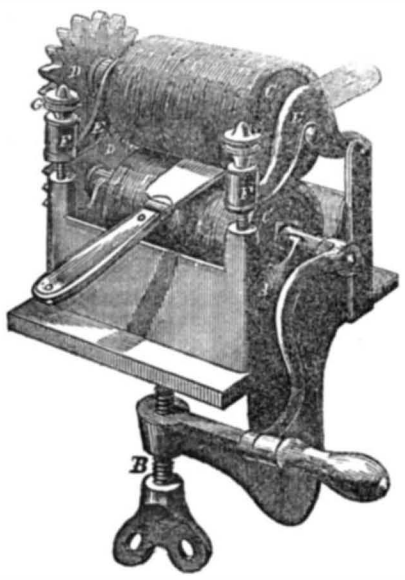
A Wonderful Iron.

A Mr. Howell has invented a secret method of making good puddled iron quite fluid by mixing with other ingredients, and thus produces what is termed in the transactions of the Liverpool Polytechnic Society, "Homogenous Metal," alleged to be as tough as copper and as strong as steel.

Rotary Knife Cleaner.

The accompanying engraving illustrates an admirable improvement in machines for scouring and polishing table cutlery.

A represents a cast iron frame (embracing the trough for holding the polishing-powder) to be secured to a table by the set-screw, B. C C are the revolving scouring rollers, formed of a series of woolen disks on a shaft, forced and confined compactly together and arranged over each other, one in and the other above the trough. These rollers are driven by cog-gearing, D D, which is set in motion by a crank on the shaft of the lower roller, as shown. E E are hinged levers, having bearings which serve as journals for the shaft of the upper roller. F F are india rubber springs, by which a yielding pressure is obtained, accommodating itself to the various thickness of knives, without resort to the set-screws, G G, which are mainly designed to compensate for any wear that may take place in the



rollers. In order to scour a knife with this machine, it is only necessary to fill the trough with some suitable cleansing material.

Having dipped the knife in water, or soap suds, (which is preferable,) place it between the rollers as shown; and then set the rollers in motion by turning the crank; the knife, of course, must be moved back and forth from point to heel as the rollers revolve.

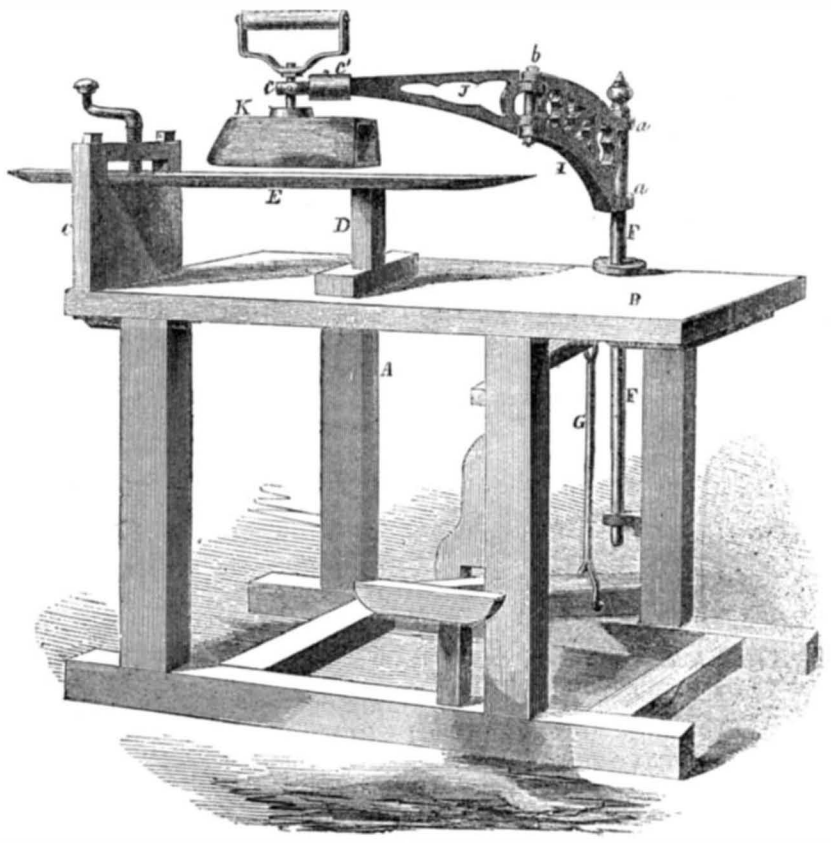
By this machine both sides of the knife are scoured at once, as the lower roller in revolving absorbs the powder, or cleansing material, and feeds it to the upper roller, and both act upon the knife with like effect—all stains and marks are removed, and the knives are polished to look as well as new cutlery.

A patent was issued for this machine to Morris & Newton, on Dec. 4, 1855, and it has been improved recently by James Wilcox, of Philadelphia, to whom communications for further information should be addressed. See also his advertisement on another page.

Improved Clothes Ironer.

The device here illustrated is intended to serve as an improvement to aid in pressing clothing. The flat-iron or goose, K, may be in any of the usual forms, and the press-board, E, is constructed and arranged in the ordinary manner. The invention consists in connecting the iron by the frames, J and I, to the upright rod, F, which latter is capable of traversing vertically through the table, B, and may be depressed by applying the foot to the treadle represented, so as to press the iron, K,

STORRS' CLOTHES IRONER.



to any extent desired. This allows of an easy motion in every direction horizontally, while by the aid of the link, G, forming a connection between the treadle and the rod, F, a degree of pressure for any kind of tailors' work is obtained without difficulty, and in a manner very easy for the operator.

To allow of disconnecting the iron and heating it, or supplying its place with another with any required degree of force upon the cloth which is being smoothed. The frames, J and I, are jointed together by the aid of the vertical bolt represented at the point, *b*, and the frame, I, is so connected to F that it is free to be turned thereon in a horizontal plane the joint, C', where the swivel, C, is attached to the frame, J, is made capable of easy and instantaneous disconnection by a socket and tenon, or by some other suitable means.

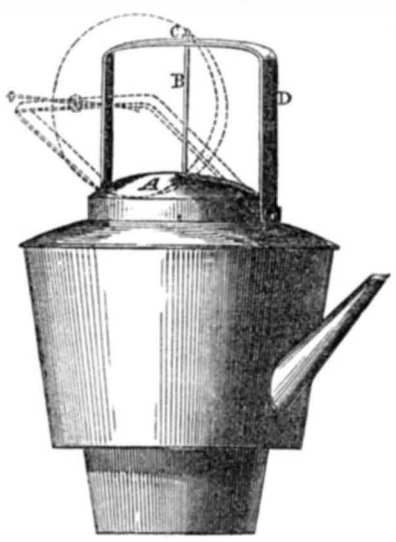
Measures have been taken to secure a patent for this very convenient device. Further information may be obtained by addressing the inventor, L. B. Storrs, Canton, St. Lawrence co, N. Y.

Patent Tea Kettle.

This figure illustrates a very useful improvement in tea kettles. The lid is connected with the handle or bail by a thin bar, in such a manner that it may be lifted off from the kettle without being touched by the hand.

A is the lid fitted with a flange in the neck of the kettle in the usual way. B is a small flat rod attached to the lid near its center; it passes up through the center of the bail, D, into a slot at C, and a pin is inserted through it above the handle.

From this plain description, it will be seen that the lid, A, when fitted within the neck of the kettle, will keep the handle, D, in a vertical position, and if the handle be moved to either side, the lid will be raised as shown



in dotted lines. The handle is not allowed to be in contact with the body of the kettle on the fire, consequently it never becomes unduly heated. It can therefore be always grasped by the hand, and the lid raised with facility, and without danger. The lid is not required to be handled at all; it is both raised from and put on the kettle by the handle, and it is also prevented from falling off when the kettle is tipped to the one side for any purpose. This is a very useful domestic improvement, both as it regards safety and convenience.

It was patented on the 21st of April last. For more information address the patentee, James Greenhalgh, Senr., (Blackstone Post Office,) Waterford, Mass.

Railroad Celebration.

On the 5th and 6th of June, the ceremonies attending the opening of the Ohio and Mississippi Railroad will be duly celebrated at Cincinnati, Vincennes and St. Louis. This is a broad guage road, and opens a direct communication between the above important cities. It will no doubt be an occasion of much interest, as it is expected that a large number of distinguished guests will participate in it. We shall endeavor to furnish such incidents in connection with it as may be likely to interest our readers.

A Great Dam.

A short distance above Fredericksburg, Va., a strong dam has been erected across the Rappahannock river, 572 feet between the abutments, and 18 feet high. The water is conveyed into the town by a canal one and three-fourths of a mile long, giving 47 feet fall. This power is intended for manufacturing purposes. The City Council have also passed an ordinance to exempt from taxation all manufacturing establishments for ten years after their erection.

The Frigate Niagara.

This new steam frigate left New York on the 24th of April, and arrived at Plymouth, Eng., on the 12th of May—eighteen days. This passage was longer than was expected but during one day she run 300 miles—an average speed of twelve and a half knots per hour, which is very good, but not extraordinary.

Another Search for Sir John Franklin.

A very strong screw steamer is now on the docks at Aberdeen, Scotland, fitting up to make a last effort in the search of the lost Arctic navigators, Sir John Franklin and his crew. The vessel is built on the diagonal principle, and is getting a doubling of African teak, between which and the outer planking there is a thick covering of felt. She measures 132 feet of extreme length, 25 feet of extreme breadth, with a depth of hold of 13 feet, and a draught of water of 11 feet. The screw is being fitted with lifting gear, and the engines are of a very powerful character. The work is so far advanced that she will be ready for sea by the beginning of July. She will have a crew of thirty men and officers—most of them volunteers. They will be chiefly from the north of Scotland, and well accustomed to the hardships of an Arctic voyage. The commander is Capt. McClintock, an old Arctic navigator, he having served under Capts. Ross and Austin.

This expedition appears to us to be foolhardy, but Lady Franklin has sold large estates which she had in Australia to fit out the expedition, and the commander is enthusiastic that he will be successful and bring home some satisfactory accounts of the lost vessels, *Erebus* and *Terror*, belonging to Franklin and his party.

The Vanderbilt.

The new steamer Vanderbilt made a very quick passage to England from this port, considering it was her first trip. She left New York on the 5th ult., and arrived at Cowes on the 15th., in the evening—the time being less than ten days. This is the fastest *first* voyage made by any new steamer across the Atlantic.

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